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LION-HEARTED FLUSSER.

A NAVAL HERO OF THE CIVIL WAR.

By CHARLES W. STEWART.

"Flusser is the name to conjure with," wrote Assistant Secretary Fox to Major-General Butler in 1864.

Charles Williamson Flusser was one of the most gallant spirits in the War of the Rebellion. For three years, from 1861 to 1864, as a lieutenant and lieutenant-commander in the United States Navy, he rendered conspicuously gallant service in positions of responsibility and extreme peril, ranging from cutting-out expeditions to his mortal combat in wooden gunboats against the Confederate ironclad Albemarle at Plymouth, N. C. He fell on the deck of his own vessel, gun-lanyard in hand, instantly killed by the 9-inch shell that he had fired against the enemy's sloping iron roof not ten feet from the muzzle of his gun. He is not great by reason of his tragic death, but he is conspicuously remarkable for the zeal, efficiency, and cheerfulness with which he served, under peculiarly trying circumstances, the navy and the nation; and for the glorious example of honor, virtue, and patriotism that he furnished in his own person.

It has been said that a man's training should begin at least two hundred years before he is born. It is of record that three generations of Flusser's ancestors gave him a heritage of valor and

virtue. The Flussers of Germany, Austria, and Bohemia were sailors, soldiers, and merchants. William Flusser, in youth a sailor, in middle life a merchant prince of Prague, Bohemia, wedded in London, in 1797, beautiful Pauline Mayfield, daughter and sister of the Mayfields, money-lenders to the King. At Prague, in 1798, the first-born was named Charles Thomas for his mother's English brothers, Charles and Thomas Mayfield. The child throve, and although there were brothers and sisters, he was given every special advantage that money, travel, and tutors could furnish, and was the worthy heir-apparent and intended successor to the father's great estate. He was tall, graceful, a scholar, a linguist, a musician, and a man at seventeen. He labored all of one stormy night on the battlefield at Prague, caring for the wounded, and returned home at dawn, wet to the skin. The stern father, in a rage at the self-exposure of his son and heir inflicted upon him a cruel beating that was never forgiven. In the night after his dear mother's funeral, Charles Thomas left the Flusser home, made his way to Genoa, and as an emigrant sailed for the country that was the hope and haven of all the world's oppressed. Landing at Baltimore, in 1816, his personal beauty and bearing were so winning that he was at once taken by a Mr. Furlong, of Charles County, Maryland, to his country home as family tutor. He was tall and ruddy, with blue eyes and curly brown hair, loved and admired by all who knew him. It is said that money and letters from Bohemia were returned marked "Not wanted."

Charles Thomas Flusser came from Charles County to Annapolis in 1821, seeking a larger field for his talents, and opened a successful select school for young women, teaching belles-lettres, music, dancing, and deportment. Some of the proudest ladies of Maryland gained in gracefulness, if not in grace, in "Flusser's gentle-school." The discipline was not cruel. At one time observing through a window two of his pupils jumping over desks, he entered the class-room, assembled the school, and holding an offending lady on each of his knees gave them a lecture on deportment. His favorite pupil came to class the day before an assembly ball with her hair done up in curl-papers, and this gentle teacher laid hands upon her and extracted every paper while the culprit and scholars shook with laughter. The lady of the curl-papers, Miss Juliana Waters, became Mrs. Flusser in

1827. Apparently, this marriage caused the closing of the select school, in which the rewards of merit were the approving words and smiles of the handsome principal. Flusser, about the time of his marriage, was admitted to the bar and appointed Professor of Languages at the University of Maryland, where he filled the professorial chair with dignity and credit for ten years.

Juliana Waters, mother of Charles W. Flusser, was a daughter of Jonathan Waters, of Annapolis. The family was of Revolutionary, navy, and army stock. Her great-grandfather, John Willson (d. 1751, of Willson's Deare Purchas, sometime a soldier), gave his daughter Catherine to Nathan Waters, afterwards a Continental soldier. Nathan's son, Jonathan Waters, of Annapolis, also a Continental, survived confinement in Charleston prison-ships and married the accomplished and beautiful widow, Henriette Mayo, née Thornton, once adherent to the crown. This charming lady was a kinswoman of the Thornton, Jenkins, and Parker families of our navy. By her first marriage she is an ancestor of the navy Mayos. Her son, Isaac Mayo, rendered gallant service and died a commodore in 1861. Another son, Nicholas Biddle Mayo, resigned from the navy to fight a duel, passed into Mexico, and fell a victim of treachery at Goliad. Jonathan Waters' brother William, Continental surgeon, dressed the wound of Lafayette at the Brandywine. William's son Kerwin Waters, of the Enterprise-Boxer fight, lies in Portland, Me., beneath the beautiful monument erected by the young men of that city. Two cousins of Juliana Waters fell at Bladensburg. Several of her kinswomen married naval officers. John Taylor Wood of the United States Navy, commander in the Confederate States Navy, and aid to Jefferson Davis, was one of these fortunate men.

A child of the blood of Waters and Flusser might well be expected to stand in the front rank of any assembly where fate or fortune should place him. The call of the blood is strong, and when it is aided by habits and examples of his people their teachings become principles, their examples ideals, to the man of healthful body and sound mind.

Juliana Waters was fit to be the mother of heroes. Charles Thomas Flusser was possessed of the gift of tongues, a mastery of logic and of the pen; a metaphysician, fit to be the father of scholars, diplomatists, and scientists.

Their second son, Charles Williamson Flusser, was born in Annapolis, Md., September 27, 1832, under the sign of Mars, in a howling gale that drowned his wailing cries, and perhaps cast his fate and decreed what seemed the accident of his death, which occurred under the same sign.

The Flussers moved to Vicksburg in the hard times of 1837, and shortly after located or settled in Louisville, Ky. The father became an honored member of the Kentucky bar and a friend of George D. Prentice, editor of the *Courier-Journal*. He suffered greatly in health. The mother managed a small hotel to help furnish food and clothing for eight vigorous romping children. The hotel was a good one. The best of the foreigners in Louisville boarded there. It was a place of music, song, and cheeriness, of entertaining, instructive, scholarly talk, a home of the sturdy Lutheran faith, of temperate, frugal habits, good morals and personal cleanliness. At night the mother sewed and mended for her children. They were conspicuous for neatness in dress. There were no sewing machines in those days. As the mother worked with shears and needle, after the younger children were put to bed, Charles, who was as the apple of her eye, would read to her till long after midnight. Here was laid the foundation of that knowledge and love of literature that later surprised his instructors and few intimates, for Flusser knew Shakspeare by heart. He knew the Bible and its history. For works in Spanish, French, and German he required no translator. He could whistle whole operas. His chief mental recreation was a new study.

A story is told, that while Flusser was with the Coast Survey, a gentleman brought a letter written in Syriac or Arabic to the superintendent, Bache, asking for a translation. The letter was turned over to Flusser. The translation was satisfactorily made, but the gentleman objected to Flusser's bill of fifty dollars for the work. Flusser remarked that in his opinion fifty dollars was a dirt-cheap price *as he had to learn the language,* and the gentleman paid the bill in great good humor.

In his fourteenth year, as a personal favor to Mrs. Flusser, Captain William H. Chambers, representative in Congress from the Louisville district, obtained from President Polk his appointment to the Naval Academy. From that time his life was in and of the navy. The members of his family have told interesting

stories of his boyhood. A sister said that he was not like other boys. At dancing-school he sought out the wall-flowers for partners. He rescued a drowning boy from the river and later punched the face of the rescued for telling of it. Four of his six nephews have saved drowning persons. Charles once sailed into a butcher boy who was beating a horse. The boy butcher promptly took a fall out of the future naval hero, laying his scalp open and leaving a permanent scar. This child was the leader of one boy-clan that fought another clan for the possession of a certain back fence. The reward of the victors was the right to sit astride the fence, yell like fiends, and pound the fence with wooden swords. He was a boy among boys, but a leader always. The sister considered his most prominent characteristics in boyhood to be love of duty and love of his mother. In manhood he was little changed in these respects. Love of duty was more pronounced and included love of flag and country. His love for his mother became a passion, and he compared all other women with her as a standard of perfection. He always respected womanhood and was a ready knight for every woman and child that needed his protection.

After his appointment as midshipman came, in the summer of 1847, he studied for the Naval Academy entrance examination sitting under the low-spreading branches of a large tree in the garden, six-year-old sister Fanny comfortably placed in the tree with her doll, and the baby brother, Guy, in the cradle rocked by his foot. He was thus to his last day at home always relieving his dear mother of care and worry. On leaving home, he kissed them good-bye and said, "Don't cry little Fan, I am going to earn lots of money for you and mother." When at sea, he always left a half-pay ticket for the mother.

At Annapolis he was a favorite, and all reports of service there and at sea were commendatory. While a midshipman his captain reported him fully competent to perform the duties of higher grades. His yearly standing continually improved. In June, 1853, it was number four, with 88 per cent of the combined maximum multiple, and mathematics 97 per cent; French 97 per cent; gunnery 86 per cent; seamanship and tactics 76 per cent. The last was his lowest mark. He stood easily first in some subjects, high in all, and without apparent effort. He has stated that he shamefully neglected his studies at the academy and read

for pleasure stories of the sea, wars, and battles. He wrote in his ordnance book when a midshipman, "In my opinion, to locate, attack, and destroy the enemy's armed forces in the shortest possible time is the most proper, wise, and merciful course in war."

The following extract from a letter written by a naval officer of flag rank describes the person of Flusser:

* * * On two occasions we were thrown together as instructors at the Naval Academy. We had rooms in the bachelor's quarters and became very intimate, and although there was a difference of only three or four years in our ages he often spoke to others of me as his younger brother. I had the greatest admiration for his character as an officer and a gentleman, and for his many varied attainments and showed this by deference to his opinion and advice. He was generous to a fault, although not a spendthrift, and I never knew him to be guilty of an ungentlemanly or mean act.

Unfortunately, he left no picture that would convey to strangers the kind of man that he was. He was about five feet seven and a half inches in height, slim in build, and of a graceful, erect figure. His face indicated the strength of his character and his eyes were large, bright, and expressive. When he smiled he slightly showed his white teeth through his small brown moustache, and his expression was most winning and kindly. When angry, he showed in his face a determination that convinced me of the truth of stories that I had heard of his courage and prowess in his younger days.

He was temperate in all things, not drinking even wine. He was quick in his movements and very active. I have seen him stand at the foot of my bed and spring on to the bed backward over the foot-board which came to the small of his back. Sometimes in going out of the grounds, he would tell me to take the gate, and then he would scale the high wall like a cat, and be waiting for me outside.

He would have made himself a famous mathematician if he had turned his attention in that direction. He was fond of good books and had many. He had a deep, well-modulated voice, and was an excellent reader. He would take up a prayer-book in my room and read portions of the beautiful service as I never heard it read, without affectation. He could quote Shakspeare accurately and with startling effect, and if he had so wished could

have made himself a great tragedian. He made a study of words and their correct pronunciation, and to aid him, he divided up a dictionary for convenience of handling.

Flusser was cool under all circumstances, and apparently without nerves; but he once told me that he was naturally of a nervous temperament and had made up his mind not to show he was under excitement no matter what occurred. His will-power was so great that he was able to the end to carry out this determination. On one occasion, in my room, we were overhauling our revolvers. After cleaning his, he was lowering the hammer, when his thumb slipped, the cartridge exploded and the bullet just grazed my head and was buried in the window-casing behind me. Flusser, although he must have been much shocked, merely arched his eyebrows, which was his wont, and said, "My dear boy, I nearly killed you," and then turned so that I could not see his face, laid the revolver on the table and was silent for some hours afterwards.

Flusser was sometimes given to harmless practical jokes. One night, in his white uniform he asked me to take a walk. I declined, saying I had some studying to do, when he replied, "That is right, my boy; keep ahead of the youngsters." He went out and returned in an hour or so, smiling. He said that he had gone to the cemetery to the tombs of relatives, and had sat down on one of the vaults, which, by the way, was the same one in which some years afterwards, I temporarily placed his remains sent from their first burial-place. After meditating upon what the future had in store for him, he arose and went to the gate to go out when a negro passed across the field a short distance from him, caught sight of him, gave an unearthly yell, and started for the shanties in Lockwoodville, with Flusser chasing him. As he came near the houses, the man disappeared. Flusser said that the darkey would repeat to his dying day that true ghost story. I have related this to show that Flusser was not that austere and serious man that strangers sometimes thought him. * * * *

Flusser graduated number six in the class of 1853. This was a fighting class, headed by John Taylor Wood of Kentucky and footed by John Irwin of Pennsylvania. Flusser fell at Plymouth; Cummings at Port Hudson; Gwin at Yazoo River; Newman, Belknap, Williams (lost in the Oneida), J. P. Foster, Harmony, Henry Wilson, Benham, McGunnegle and Irwin survived the

war with fine records in the Union Navy; Wood, Thorburn, and Eggleston fought for the South as bravely as their classmates fought for the Union.

Returning to Norfolk from South America and the Paraguayan Expedition in the brig Dolphin, commanded by Charles Steedman, in December, 1860, Flusser found his beloved country seething with secession. He had one quarrel with a brother officer who asserted the right to "cuss" the United States at any time or place. This nearly led to a duel with Flusser, and it was finally agreed that no one was to say anything whatever against the United States in Flusser's presence.

Flusser was a geographical Southerner of Maryland and Kentucky, where state pride was always a ruling passion. "My Maryland" and "Old Kentucky Home" are the best-loved state songs. Officers, as a rule, sided with their states, which included their families, relatives, and dearest friends. A Southerner rarely sided with the North; because that meant for him the contempt and hatred of his kinspeople. Regarding divided allegiance, there were on either side in the Civil War members of the naval families of Farragut, Porter, Dahlgren, Buchanan, Lee, Drayton, Parker, Wise, Dornin, Adams, Stribling, Henderson, Taylor, Mayo, Evans, and Flusser. Most of the younger officers went with their states. Kentucky, occupying middle ground, furnished Jouett, Flusser, McCann, Pendergrast, Terry, and Watson to the Union, and John Taylor Wood, Langhorne, Dunnington (of *Arkansas Post*), Shryock, and Benton to the Confederacy.

The Southerners who remained loyal to the Union were, at first, suspected of disloyalty. Even the immortal Farragut, according to his foster-brother, was not excepted from this general suspicion. Mrs. Farragut's brother, Benjamin P. Loyall, went South, but the admiral would say, with a twinkle of the eye, "Mrs. Farragut was Loyall."

When Flusser had laid up the Dolphin at Norfolk, where she was later destroyed when the navy-yard was abandoned in 1861, he obtained a few days leave, and included New York City in his route to home. Brother officers from slave states assumed that he would "go South." To this suggestion, made to him by an officer of high rank, a life-long friend, he replied in the following characteristically loyal letter sent to the New York Hotel (a famous rendezvous for Southerners), and published with comments in the New York *Commercial:*

NEW YORK, Thursday, Jan. 3, 1861.

Dear Cap:

I shall never do it. What! be one of the very first to fire on the flag? Not I!

I have no appetite for argument to-night: my heart is sick. Is it not enough to drive an honest man out of his senses to find thieves making a great nation destroy itself?

Where are your wits, man? How can this business end? In "peace" and "slavery"? The end may bring the death of both forever; and worse, inaugurate an era of blood unparalleled. Will the South be whipped by the North? Not while one Southerner lives. Will the North be whipped by the South? Not while the Alleghanies rise above level land. Just look at the prospect: blood: rapine: desolation! war!

Hollins!!

Thou canst not shake thy gory locks at me and say—I did it.

Yours, in Union,

C. W. FLUSSER.

Captain Du Pont asked for him and with the settled prospect of duty at Philadelphia, Flusser hurried to Louisville, to visit home and loved ones. Here everything was changed. It was openly proclaimed that the Union would soon be dismembered into three confederacies, Confederate States, New England States, and United States, the last to be the smallest and weakest of the new nations. The accomplished father had died in 1858. All the family, except a little sister, was for the South, and Flusser said that he behaved beastly in this last visit. Small wonder if he did behave beastly. Even the negro cook condemned him. Seeing the letters U. S. N. she said, "That means Uncle Sam's Nigger; Marster Charles, you is just as much a nigger now as I is. You has to do just what your marster Uncle Sam says to do."

Ordered to the Naval Academy as instructor in tactics and gunnery, he took the train for Annapolis. His farewell word, at the Louisville depot, to his brother and home friends, was an exhortation to be loyal to Lincoln and the Union. This talk was overheard and was unfavorably commented on by the train baggage smasher. That baggageman may have been a Confederate. Flusser's Union trunks containing his sword and uniforms disappeared, and Flusser always thought that baggageman guilty of offensive partisanship.

At Annapolis, his birth-place, he was ostracized by kinsmen and former Southern friends because of his outspoken Union sentiments. He shed tears of bitter grief—"grief for the ostra-

cizers"—he wrote. Commodore Isaac Mayo, a half uncle, resigned and died in the spring of 1861, and at the grave the minister praised and lauded Mayo's course in resigning from the navy "just in time to save his honor." At the close of the ceremonies, considering it a good opportunity, Flusser made before the assembly a strong Union speech, declaring that in his opinion the uncle had not died any too soon for his own good and the good of his country.

Those were troublous days at Annapolis, and the youngsters from the South (about one hundred), with the notable exceptions of Silas Terry, Evans, and Pegram, resigned to go with the Stars and Bars. The Academy was ordered to be transferred to Newport, and Flusser's energy in loading the outfit pleased Brigadier-General Butler, who earnestly requested Commodore Blake, the superintendent, to detail the strenuous young officer to the army as Captain of the Port of Annapolis in charge of the army transport service. The detail was made, and Flusser was in high feather for a time. He handled the transports with good results, and organized raiding parties, which captured vessels and supplies. The army needed locomotives, and Flusser went to the railroad at Bush River, captured and transported two locomotives by ferry boat to Annapolis, and in great glee ran them himself to the railway depot over the tracks laid by Butler, thus relieving the railroad blockade. Butler did not fail to commend his Captain of the Port.

The work at Annapolis became tame and safe with the arrival of many regiments. Flusser applied for sea duty and was assigned to the old ship Jamestown, which blockaded Savannah and Fernandina. Near the latter place, on August 5, 1861, he led a cutting-out expedition with Phythian, Geo. P. Houston, and Dr. Clymer in the boats. Pulling through the fire of shore batteries they burned the stranded bark Alvarado of Boston, preventing a valuable prize from falling into Confederate hands. Returning in the Jamestown to Hampton Roads for supplies he was ordered, January 9, 1862, to the command of the Commodore Perry, a Fulton ferry boat made into a man-of-war, and in command of the Perry he led the famous Goldsborough Expedition, sometimes called the Burnside Expedition, in the Sounds of North Carolina. Roanoke Island, strongly defended by forts, gunboats, and obstructions, was the place first attacked. It was captured February 8, 1862.

The battle of Roanoke Island was the best planned and the best executed co-operative movement of the Civil War. It was the initial and strategic victory, followed by others in a logical sequence: at Elizabeth, on the Pasquotank, February 10; at Edenton, on the Chowan, February 12; at Winton, on the Chowan, February 20; at New Berne, on the Neuse, March 14; at Washington, on the Tar, March 21; at Beaufort and Morehead City, commanding Beaufort Harbor, the southern entrance to the sounds from seaward, April 26; at Plymouth, on the Roanoke, May 16. In each of the foregoing affairs, except that at Beaufort, Flusser, in command of the Commodore Perry, played an important part. The net result of these victories was the control by the Federal Government of the extensive sounds and shores of North Carolina and the wonderfully ramified waterways, including the mouths of five important rivers. The navy thus had a stranglehold on North Carolina's water traffic and deprived the Confederate Army of supplies from many fertile bottom counties, and further, prevented the export of vast amounts of Confederate cotton, upon which the South was dependent for funds to pay her bonds, and to purchase arms and munitions of war. These eminently successful joint operations covered a period of about one hundred days. Goldsborough and Burnside received the thanks of Congress, and the naval officer second in rank, S. C. Rowan, was later made vice-admiral.

At Roanoke Island, the Union fleet was ready to attack the Confederate defenses by February 5, 1862. The next day was selected for the advance, but thick weather delayed the action for a day.

On February 7 the weather was clear and fine. The Union vessels steamed northward in double column, up the middle of Croatan Sound, toward the enemy's fleet and forts. The sound was about four miles wide, the water shoal, and the channel uncertain. Roanoke Island is curved with concave side to the west. It is ten miles long and three wide. Between it and the mainland lies Croatan. Fort Huger, on Wier's Point, and Fort Bartow, on Pork Point two miles below, with field batteries between the two forts, were shore defenses of the island. At Fort Bartow, the lower fort, a double row of piling extended westward across the sound toward Fort Forrest at Red-stone Point, on the main land or west shore. The piling obstructions were strengthened by

sunken hulks. Northward of the piling and behind it lay the Confederate fleet of eight gunboats. The bombardment by the Union fleet became general by noon of the 7th and ceased at dark, 6 p. m. The Confederate fleet retired behind Fort Huger, the upper fort. Fort Bartow was injured but not silenced. In the afternoon and night of the 7th the naval battery, under Midshipman Benjamin H. Porter, and Burnside's army of 10,000 men were landed at Ashley Harbor, some three miles below Fort Bartow.

On February 8, by 9 a. m. the Union land forces were well advanced toward the rear of Fort Bartow, and the naval bombardment began fast and furious. The Confederate vessels did not appear. Lieutenant Jeffers, with the Ceres, located the channel, or best water, through the obstructions; the piles and hulks were pulled aside, and about 4 p. m. Jeffers with several gunboats passed through. At 4.30 the land forces entered Fort Bartow, hoisted the Stars and Stripes, and Goldsborough signaled "Victory." The Confederate steamer Curlew was blown up by her crew at 5.15. At 7.15 Generals Burnside and Foster announced to Flag-Officer Goldsborough the capture of Roanoke Island, 40 guns and 3000 prisoners. This was Flusser's first battle. His vessel ran close to the batteries and expended all her ammunition. Goldsborough reported that he had to recall the Commodore Perry as she was very near the Pork Point battery. Flusser's vessel was hulled eight times. One shot passed through an empty powder tank in her magazine. By great good fortune she was not blown up and had only one serious casualty.

Commander Rowan, with the Commodore Perry under Flusser, and twelve other gunboats, went after the Confederate vessels that had escaped from Roanoke Island to Elizabeth City on the Pasquotank River. He attacked at 8 a. m. February 10, capturing one gunboat and the strong fort called Cobb's Point. Two gunboats escaped. The others were destroyed, and Elizabeth City was at once occupied by the navy. Flusser, in the Commodore Perry, was given the lead. He rammed and sunk the Confederate flagship Sea Bird, and captured her crew and officers. Flusser landed at Cobb's Point, hoisted the Union flag in place of the Confederate colors at 11.50 a. m., and spiked and dismounted the guns. The fight was a warm one. The two killed were on the Perry, and she had one-third of the total casualties. Flusser

cared for Midshipman William C. Jackson, fatally wounded on the C. S. S. Ellis, and buried him with all the honors of war. Jackson was a Virginia youngster at the U. S. Naval Academy and resigned in April, 1861, to "go South." His father, a minister, made grateful acknowledgment to Flusser. At this battle, John Davis, gunner's mate on the U. S. S. Valley City, "while at his station in the magazine when the shell penetrated the side and ignited the berth-deck as above reported, did cover a barrel of powder with his own person, thereby preventing an explosion." This is but one of many gallant deeds of that day. A story is told that the C. S. S. Ellis was run ashore and abandoned. Her captain, J. W. Cooke, afterwards commander of the C. S. S. Albemarle, left alone on deck, tried to defend himself by firing muskets at his enemies. Flusser, in a barge, boarded the Ellis and found Cooke still refusing to surrender, lying flat on his back, slashing about with his sword and kicking viciously. The men were about to shoot him but Flusser begged them not to and proposed that they disarm and tie the fighter. This was done with shouts of laughter, and Flusser's stratagem saved Cooke's life.

Alexander Murray with four gunboats, including the Commodore Perry, captured Edenton February 12.

Rowan, in the Delaware, and Flusser, in the Commodore Perry, ascended the Chowan to Winton on the 19th. The Delaware ran into a furious fire of musketry and artillery and was saved by the readiness of Flusser, who poured shrapnel into the enemy until the Delaware was extricated. Rowan returned in large force on the 20th and destroyed all defenses and stores at Winton. About this time Rowan sent Flusser in the Perry to Elizabeth City to watch that place and collect information. Rowan was apprehensive that the Confederates might send vessels from Norfolk to the sounds through the Albemarle and Chesapeake Canal. Rowan reported that the army having failed to close the canal he had sent Flusser to do it and that he had accomplished the work in his usual able and energetic manner. Flusser reported that it would be easier to dig a new canal than to remove the obstructions he had placed in a day and a half.

Rowan attacked New Berne in a joint expedition March 13-14. Fourteen gunboats, including the Commodore Perry under Flusser, army forces, and naval batteries ashore, successfully repeated the tactics employed at Roanoke Island, and occupied New

Berne March 14. Thirty guns, many prisoners, two steamers, several loaded schooners, and a large quantity of stores were taken. The fighting on shore was severe. Rodney McCook, gallantly commanding naval howitzers, lost heavily. When the land forces arrived at New Berne the navy was in possession. The Commodore Perry led the naval procession as usual, but in passing the obstructions she struck on one of the iron-pointed stakes. This delayed her so that she was last in entering, with the stake sticking through her. Flusser was chagrined at being last in. When he arrived at the burning town he landed without orders, pressed townspeople into service, manned the fire-engines, and saved much of the place from the flames.

Plymouth was occupied by Union gunboats, including the Commodore Perry, May 16. It was an important town and a port of entry. It lies on the right bank of the Roanoke River eight miles from its mouth and Albemarle Sound. The possession of Plymouth sealed the Roanoke to traffic. Washington commanded the Tar River, and New Berne the Neuse River. Edenton lay at the mouth of Chowan River, whose tributary waters flowed through Southern Virginia. Norfolk was occupied by Union forces May 10. Thus the sounds of North Carolina and approaches, mouths of tributary rivers, and all important towns on its shores were in possession of the Union in May, 1862. This possession was hostile and it was maintained by a warfare that ended only in June, 1865. The last Union operation there was the raid of Commander Macomb in Roanoke River, June, 1865, when he burned a war vessel on the stocks at Halifax and recovered the little picket launch No. 1, in which Cushing had attacked and sunk, by a torpedo, the famous ram Albemarle.

The fight for possession of the sounds was serious business and Flusser was the most active man in it. He enjoyed the confidence of his eminent superiors, Rear-Admiral Lee and Commanders Murray and Davenport, and was given a rather free hand by them. Plymouth was his usual headquarters and depot. From there he controlled his little squadron. When there was nothing doing in aid of the army his vessels roamed the rivers, breaking up contraband trade. The total value of captured property, including cotton, was enormous. There were many expeditions, generally co-operative, and the soldiers seemed to enjoy the dashing hazardous adventures in narrow winding rivers, fighting guerrillas

and masked batteries on the banks, making marches and attacks where least expected by the enemy.

At Franklin, Va., Flusser's boats had a narrow escape from capture, October 3, 1862. Franklin was a town on the Blackwater River, about twenty miles by water north of the state line and on the Seaboard and Roanoke Railway, twenty-two miles west of Suffolk, Va. Major-General Dix arranged with Rear-Admiral Lee, commanding the North Atlantic Blockading Squadron, for Flusser's co-operation and aid in destroying a bridge at Franklin. The burden of responsibility was placed on Flusser as Lee's orders left the practicability of the proposed operations to his judgment. Dix and Flusser agreed upon 6 a. m. October 3, for the joint attack. The Commodore Perry, Hunchback, and Whitehead arrived at a point six miles below Franklin in the night of the 2d, and were under way at 6 a. m. the next morning, the Perry ahead. While rounding the bend three-quarters of a mile below Franklin, at 7 a. m., the enemy posted in the woods on Crumpler's Bluff opened fire on them. They steamed past as quickly as possible. The Perry had run ahead and with a rapid discharge of shell and shrapnel kept down the fire of the enemy, and the other two boats passed the dangerous bend in safety. They found the river below Franklin obstructed and impassable. They lay at the obstructions, shelling Franklin and the banks generally, hoping for the sound of Union army guns, but no such welcome music reached their ears, and at 10.15 a. m. the perilous downstream passage began. Confederates, both soldiers and civilians, fired on them from every available point. Trees were felled across the narrow stream but the boats pushed through with a heavy head of steam and escaped. There were many acts of great bravery. Lieutenant W. B. Cushing, at this time and place, received his baptism of fire on the Commodore Perry under the eye of Flusser. When under fire, and the boat against the bank, the Confederates started to charge the Perry. Cushing, in charge of the forward gun, after every man of the gun's crew but himself had been driven to cover, killed, or wounded, deliberately depressed the muzzle and at the right moment fired a 9-inch canister that stopped the charge and saved the vessel from capture. Cushing was warmly commended. Flusser wrote to Davenport—"Cushing behaved like a gallant boy. I had frequently to oblige him to seek shelter from the enemy's fire. It was the severest fight I have been in. With

my usual good luck, I was not hit." E. R. Colhoun, who had resigned from the navy, commanded the Hunchback in this fight, as an acting lieutenant. Flusser warmly recommended that he be restored to the regular navy and stated that he would gladly serve under him. Colhoun was restored and outranked Flusser.

Major-General Dix reported to General Halleck that the army had waited for the navy at Franklin, on October 3, 1862, and had kept the enemy at bay the entire day, finally drawing off at night. Among Flusser's private papers, forty years after his death, was found a note from Dix, dated September 30, 1862, stating "We cannot be ready till about the 10th proximo." * Here was an issue of fact, and Flusser's tact in suppressing Dix's note marks him as a diplomat. When the messenger bearing Dix's note of September 30 to Flusser returned to Suffolk, late in the evening of October 2, reporting his failure to deliver the note to Flusser, as the gunboats had left for Franklin five hours before the messenger's arrival at the Chowan, Dix, or Peck, commanding at Suffolk, ordered a forced night march on Franklin. The Union troops reached that place October 3, about 1 p. m., seven hours late and three hours after Flusser's departure. Flusser's reports to Lee and Davenport mention Dix's note only as a request for naval co-operation in a proposed attack on Franklin, October 10, and state that he would not take part in the proposed movement without a positive order from Lee. The order was not given.

Official reports of this hazardous expedition are in Naval War Records, volume VIII, and Army War Records, volume XVIII. They are well worth reading.

* HEADQUARTERS DEPT. OF VIRGINIA.
7TH ARMY CORPS, FORT MONROE, VA., 30 SEPT. 1862.

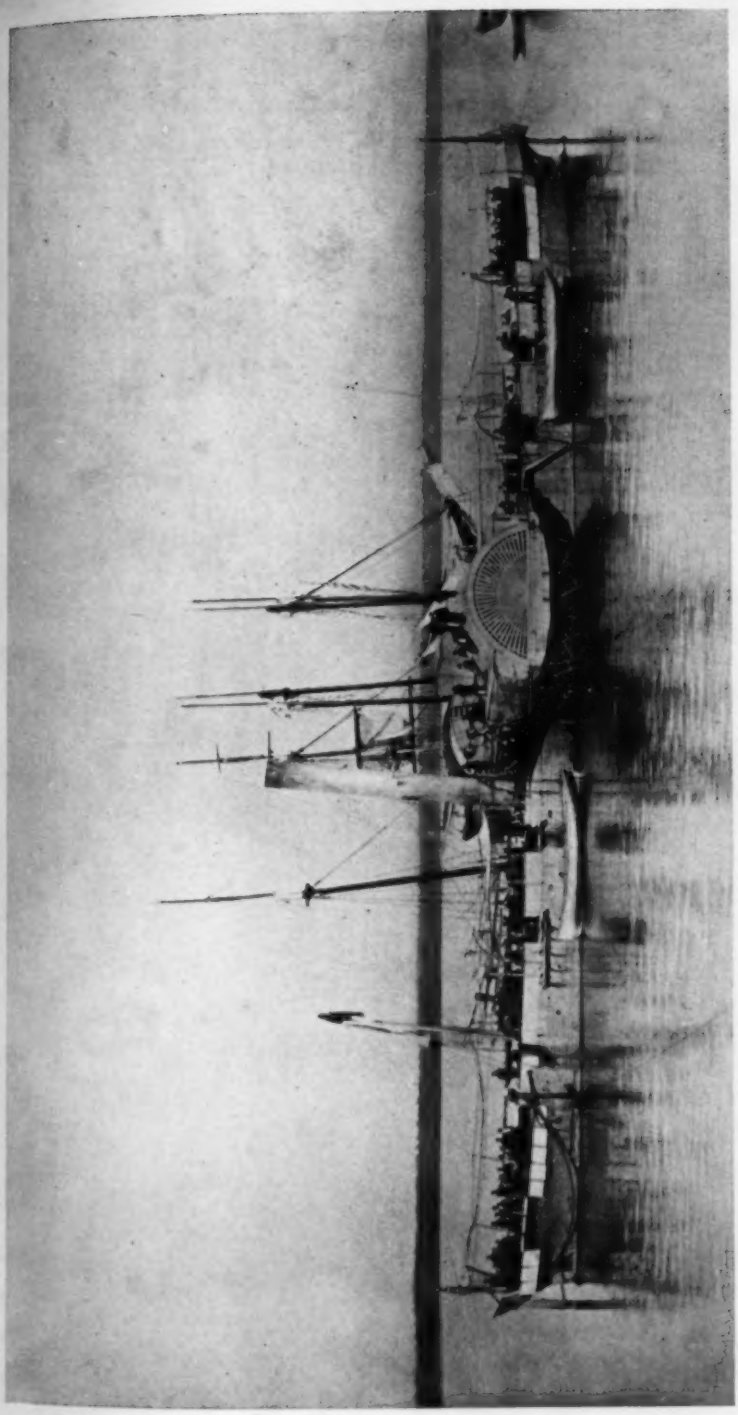
Sir:

In consequence of some unexpected obstacles, we cannot be ready till about the 10th proximo. I will give you three days notice.

The bridge has not been reconstructed at Franklin for the Roanoke and Seaboard Railroad. But a floating bridge has been thrown across the Blackwater at that point. A large force has been sent down from Petersburg, but we think the bulk of it is at Zuni, the crossing of the Petersburg road. We are quite strong at Suffolk.

Respectfully yours,
JOHN A. DIX,
Maj. Genl.

Lieut. Commander C. W. Flusser,
Comdg. U. S. Steamer Commodore Perry.



UNITED STATES STEAMER MIAMI, AT ANCHOR IN THE SOUNDS OF NORTH CAROLINA, 1864.

The Plymouth squadron was strengthened by the addition of the Miami, a staunch government-built double-ender, with battery of eight 9-inch Dahlgrens and a 100-pounder rifle. Flusser assumed command of her May 8, 1863. The Miami had served with Porter's Mortar Flotilla below New Orleans, and at Vicksburg on the Mississippi River. She steered so badly that everything would get out of her way. Her capacity for taking a sheer and running away was phenomenal. It was finally discovered that she steered less badly when steaming stern foremost. Her photograph shows her at anchor with masts raking forward. The sailors called her the "Miasma."

Flusser, in command of the Miami and a small squadron, cooperated with the army thoroughly and heartily. *Every army department commander within whose territory he served asked that he be detailed to the army.* Butler asked in 1862 that he be detailed as Captain of the Port at New Orleans, saying—"He is another Farragut." Flag-Officer Goldsborough proposed taking Flusser from the sounds to command the Minnesota in the then approaching battle with the Merrimack, for the flag officer noted that the young Kentuckian conceived boldly and executed skilfully in times of extreme peril. Major-General Foster referred to him as Lion-Hearted Flusser. Flusser, writing to Davenport regarding an article in the New York *Herald* praising "C. W. Flusser the naval hero," stated—"*I have no desire for newspaper notoriety. Such articles may be intended to do an officer good, but they injure his reputation among officers, those whose opinion he regards, and can only avail with the masses whose good opinions, if undeserved, he should despise, or at least be ashamed of possessing.*"

Flusser feared only one thing. He was afraid that he might fail to do the work or task allotted him. When he would come from his cabin fresh and clean from his daily morning bath, clear-eyed and smiling notwithstanding the trials and dangers before him, his presence was an inspiration to courageous deeds. One who knew him well has said that "he was not a Christian to hurt." An intimate friend once asked him if he never felt fear at the prospect of battle and possible death. Flusser, with his quiet smile, replied, "*I have no fear. When I retire at night, I make it right with my God. When I leave my cabin in the morning I am at peace.*"

Flusser was a harmonizer in times and places of discord. He was like Farragut in many respects, always doing his best with the means at hand, dealing with himself as severely as he dealt with others, quick and just in praise or blame, but inclined to mercy; a good judge of human nature, of evidence, of men and motives; a man of infinite patience, of mental exactness, of methodical reasoning, and yet possessed of intuitive faculties, active imagination and keen humor.

Flusser always had a "happy ship." The crew of the Miami was a motley crowd. There were a few regular seamen and ordinary seamen, but the bulk was made up of contrabands, boys, soldiers, and landsmen, and riff-raff picked up anywhere, and their captain called them "buffaloes." There was much sickness and some drunkenness. An officer and seven men, all drunk, came aboard the Miami one night and Flusser made the officer stand watch, as officer of the deck, every other watch for a week. The men had the wrinkles ironed out of them, and were given willow-bark tea as a tonic.

Flusser had decided views as to how the war should be conducted. He had extensive personal acquaintance in the South and his bump of location was large; that is, he had an extensive and accurate knowledge of geography, topography, directions, and distances and their relations to military strategy and tactics. One of his duties was the collection of Confederate information for his government. The Navy Department authorized him to subscribe for Southern newspapers. He passed the military lines whenever he wished. It is said that when he went on a flag of truce expedition he always took a jug of whiskey and a box of cigars, both scarce articles in the Confederacy. Flusser weighed the mass of information and misinformation that he collected, sifted out the truth, and sent it to Washington. One of his shipmates has stated that he was once, at least, called to the Navy Department, where he presented his views in person to President Lincoln, Welles, Fox, and Stanton. He kept the Navy Department informed of the ironclads under construction by the Confederates, and advocated light-draft ironclads or monitors to oppose those of the Confederates. His reports of the building of the Albemarle form a fair history of her.

Flusser proposed the arming of loyal North Carolinians, "whereby Confederate conscription might be prevented." His

grand strategy included the capture of Weldon and the cutting off of railway communications of the South with Richmond and Tredegar Foundry, where Confederate ordnance was made. He proposed driving a Union army wedge from Weldon to Raleigh. He claimed that this would transform the army of Northern Virginia into the army of North Carolina, relieve Washington, the capital, of all fear of attack, and cause the evacuation of Richmond. He deplored the anaconda policy of a long, straggling military line extending from Norfolk to New Mexico, and urged "that it was better to knock the Confeds. out than to try and starve them out."

The summer and autumn of 1863 were warm and sickly times in the sounds. The blockade was strictly maintained. Rumors of Confederate ironclads building on the Roanoke and Neuse Rivers were disquieting. Flusser kept the Department accurately informed of the progress of work upon these vessels, and he begged to be allowed to lead an expedition to destroy the ram building upon the Roanoke at Edward's Ferry. Major-General Butler pooh-poohed the idea of any rams attacking the Union forces in the sounds. On February 17, 1864, he wrote to Rear-Admiral Lee, "I do not much believe in the ram, either in the Roanoke or the Neuse." Flusser asked a faithful, intelligent negro, who had furnished him much information regarding the rams, and had worked on them as a mechanic, what he thought of the statement that there were no rams, and the negro solemnly replied, "Them that knows nothing, fears nothing." And so, without molestation the rams were completed and made ready for battle. The Neuse, at Kingston on the Neuse River, was commanded by Ben Loyall, Farragut's brother-in-law. The Albemarle, at Halifax on the Roanoke, was commanded by James W. Cooke, a personal friend of Flusser. They waited for the 1864 spring floods to carry them over the Union obstructions near the mouths of the rivers, and it was planned to join them in the sounds. Both were under the general control of John Taylor Wood, friend and classmate of Flusser. The Neuse failed to pass down. The Albemarle succeeded.

The story of the Albemarle is a part of the life story of the youth who built her, Mr. Gilbert Elliott, born in Elizabeth City, N. C., in 1843. In 1861 Elliott was a clerk in Norfolk to William F. Martin, lawyer and boat-builder. Elliott had not learned

the trade of boat-building, he inherited it. His mother's father, Charles Grice, was a shipbuilder a century ago. The nephew of Charles Grice was Francis Grice, the U. S. Naval Constructor who built the Niagara and many other naval vessels. Elliott enlisted in the army, but at the request of the Confederate Secretary of the Navy, Mallory, was furloughed to build Confederate vessels. Mallory contracted with this boy of twenty years to build the Albemarle. Her plans were drawn by John L. Porter. Her keel was laid in a cornfield near Edward's Ferry. She was put together by James F. Snell and Peter E. Smith, mechanical geniuses. She was a twin-screw ironclad ram, 158 feet long, 35 feet wide, 4-inch armor, 9 feet draft, and carried at each end a pivoted 6.4-inch Brooke rifle, which fired from three ports. The stern gun could fire astern or on either side. The bow gun could fire ahead or on either side. She was completed under the personal supervision of J. W. Cooke, and started for Plymouth on April 17, 1864, drilling her crew at the guns and driving home the last armor bolts at the same time. Elliott served on her as a volunteer, found the channel at night, and piloted her over Union obstructions and torpedoes at Plymouth. She glided uninjured past Union forts and batteries to meet the Union gunboats under Flusser, just below the town.

The Union boats and army were ready to defend New Berne, Washington and Plymouth, isolated posts, with small garrisons, tenable only by aid of gunboats. Plymouth was the strongest of the three forts. The Confederates chose to attack Plymouth, and began April 17, 1864. Flusser, with the Miami and Southfield, double-enders, 200 feet long, each armed with 9-inch Dahlgrens and 100-pounder rifles, aided the army. He had two little steam vessels, the Whitehead and Ceres, both useless as fighting craft. Their only useful service was scouting and transport work. It was pitiful to send these frail wooden craft against an ironclad. Rear-Admiral Lee had instructed thus, "when the enemy shows himself with a force on the river at Plymouth, Lieutenant-Commander Flusser, with the whole force present, will at once rush a sufficient distance above him, firing all arms as he goes, when he can with effect, and taking the enemy in reverse, attack it by ramming and firing." This plan of attack could not be carried out in the Roanoke River, 300 yards wide, with any prospect of success. Flusser's plan was simplicity itself. It was to lash the Southfield and Miami together by rope and *chain cable* across

CONFEDERATE STATES IRON CLAD RAM ALBEMARLE.

their forecastles, and attack the ram end on, receiving her between the two gunboats. In this position the gunboats could play their forward guns on the ram's shield, and by steaming ahead jam the ram's stern into the bank where she would be helpless. The plan was good. It was the best possible method of attack under the existing conditions, and it almost succeeded although it was carried out imperfectly and incompletely. The Miami and Southfield, by a cross-fire from above and below Plymouth, effectually protected that post until late at night, April 18. The ram was expected any moment, and the Ceres was stationed at Plymouth, the Whitehead at the Thoroughfare a few miles above Plymouth, as scouts. The Southfield was above Plymouth until the Confederate fire stopped, about 9 p. m. April 18. The Miami lay about half a mile below Plymouth. At 12.15 a. m. April 19, the Whitehead arrived by a roundabout passage "from below" and reported the ram as having passed Thoroughfare. The Southfield was gotten along the port side of the Miami at 1.30 a. m. Flusser, in order to avoid the tedious and slow work of lashing the boats by chain made the fatal, but under all the circumstances excusable, mistake of lashing his boats together by rope only. The reason for this decision was that the time required to release the lashings of chain and clear the decks for action was about twice the time needed to release the lashings of rope. He had determined this by actual experiment. In order to be ready in the shortest possible time to aid the army, only the rope lashings were passed, and the wooden ferry-boats, with men at quarters, lay waiting the ironclad. At 3.45 a. m. the ram met the two ferry-boats steaming toward her, and grazing the bow of the Miami forced her prow slantwise into the hull of the Southfield. The Albemarle began to back. She could not withdraw her prow from the Southfield, then forging ahead by her own steam and that of the Miami. The Albemarle was being forced to the left river bank, the three vessels swinging slowly to the right. The Albemarle acted as a lever with the fulcrum at the Miami's stem, and tended to pry the gunboats apart. The strain upon the gunboats' lashings was tremendous. The Southfield began to fill and to settle down on the Albemarle, slowly forcing the ram's bow under water till the surface was over the portsill of the forward port and water began pouring into the shield of the helpless ironclad. At the first alarm the cables of the Miami and Southfield were slipped and the boats driven upon the ram full

head, by order of Flusser. The Southfield received the ram's prow on the starboard bow, under her heavy guard. The prow penetrated ten feet, reaching the Southfield's fire-room. The Albemarle's shield lay abreast the forward guns of the ferry-boats, and received the fire of shot and shell from both. Flusser fired the first three shots, the third being a 10-second 9-inch Dahlgren shell. When about to fire Flusser was warned by the division officer, Hargis,—"There's a shell in that gun, captain." "Never mind, my lad," said he; "we will give them this first and solid shot after," and pulled the lanyard. The shell struck the ram's shield a few feet from the muzzle of the gun, and exploded by impact, its flying fragments instantly killing Flusser, mortally wounding Hargis, and severely wounding several others. Flusser had written one week before, "In fifteen minutes after we get to close quarters my commission as commander is secured or I am a dead man." He prophesied truly. He died with cheering words on his lips, gun lanyard in hand, victory almost won, for the ram was at his mercy while the lashings held, slowly sinking with the Southfield.

Commander Cooke reported that in this condition, unable to work his great guns, water running in the forward port, he "ordered all the crew on the top deck." What for? Was it his intention to abandon the sinking Albemarle lying helpless under the pounding shot and shell of the ferry-boats? Just then the overstrained rope lashings parted, the Southfield swung to port, released the Albemarle, and slowly settled to the bottom of the Roanoke in about twenty feet of water. The ram re-manned her guns, fired two shells at the fleeing Union gunboats, and was left in undisputed possession of the field, the victor by reason of the parted lashings. The gallant and intrepid Cooke, with an untried vessel and crew, had won his laurels by the supreme test of success in battle. His victory was complete and decisive. The garrison at Plymouth surrendered April 20, with a large amount of provisions, stores, and ammunition, 25 pieces of artillery, and 1600 prisoners.

Flusser's death fell like a pall over the sailors and soldiers in the sounds. His remains were interred at New Berne with imposing military ceremonies April 23, later taken to Annapolis and temporarily placed in the Randall vault, and in 1868 finally placed with military honors on Bluff Point, in the Naval Academy ceme-

tery, being the first interment in this consecrated ground. In the box-vault on the crest of the knoll lies the dust of that good man and true "Lion-Hearted Flusser."

"But the high soul burns on to light men's feet
Where death for noble ends makes dying sweet."

[Newspaper Extract—Louisville *Courier-Journal*, June 15, 1864.]

Amongst our announcements of deaths, this week, will be found the names of three sons of Charles T. and Juliana Flusser—Ottokar, Charles W., and Guy—the first and last killed in the service of the enemy, the other dying gloriously in defence of his flag. The divided allegiance of this brave family is a forcible commentary on the sad results of a civil war. But however deep may be the parental sorrow, the mourning for a son like the gallant naval hero Flusser must be assuaged by the memory of his great services to his country, and the honor in which all true men hold his name.

DIED.

On the battlefield at Antietam Creek, Maryland, on the 17th of September, 1862, Ottokar Flusser, of the Fourth Texas Infantry, oldest son of Charles T. and Juliana Flusser, of this city.

On the 19th April, 1864, Charles W. Flusser, Lieut.-Commander U. S. N., second son of Charles T. and Juliana Flusser, from a wound received while in command of U. S. steamer Miami, in the attack on Plymouth, N. C.

On the 8th inst. on the battlefield at Mt. Sterling, Ky., Guy Flusser, Lieutenant Fourth Kentucky Confederate Cavalry, youngest son of Charles T. and Juliana Flusser.

APPENDIX.

LETTERS FROM FLUSSER TO HIS MOTHER AND SISTER.

[*Before the battle of Roanoke Island.*]

U. S. STEAMER COMMODORE PERRY,

PAMLICO SOUND, N. C., January 31, 1862.

My Darling Mamma:

I do not like to pain you by supposing the possibility of my being killed, but accidents will happen in the best regulated families, and the only pain I feel in the contemplation of so unhappy a termination is caused by uneasiness concerning you and Fan's future support and comfort.

* * * * * * * *

I have the assurance, however, that the Lord will not let those want who love him and do his will. But this I hope and believe you both do.

* * * * * * * *

Whatever individual accidents may occur, I can say with all hope for the side of the Union, may God aid the right cause! If God in His judgment assists the side on which there is order, law, the rights of the people, freedom of thought and of speech, and the hope of enlightened republicans throughout the world, then I am confident of victory. I think I could not go cheerfully into battle in a cause which I felt to be wrong, but now my heart and my reason tell me I am right, and I hold my life as the merest trifle when called upon to sacrifice it in so just a quarrel.

I regard all wars as more or less foolish and wicked in their inception, all engaged in them as more or less asses. If all men thought as I think, no armies would ever be mustered into the fields, no navies would ever sweep the seas. But unfortunately I am one of the most silly and uninfluential persons of the eight hundred millions on this globe. I accepted a position under the government of the United States a great many years ago. That position gave me a support and enabled me to render some slight assistance to my friends. To it I owe the little education (which ought to have been much better but that I lamentably wasted time and neglected opportunity) I have received. It also, as the wise world goes, conferred on me a certain standing in society, and which *en passant* none more heartily despises than myself. To be brief, it furnished me many substantial benefits and would have given me others had I stretched forth my hand to receive them. It seems to me that the Government has received a poor return from me for all these favors. My life has always been hers to command, but she has never called upon me to risk it. Now the existence of the State is imperilled, and why? Because a few unprincipled men, seeing that their employment was gone when the party was defeated, artfully wrought upon the feelings of an excitable minority, contemptible in numbers, and falsely persuaded them that their best interests, their liberties, were endangered under that government whose laws were so mild that none but the wicked ever felt them—under that government framed by the wisdom of Washington and the noble Fathers of the Revolution, that our country might be the abiding place of Liberty and a refuge for the oppressed of all lands: and finally under that government which is the slave of the people, and which, even if it so desired, was perfectly impotent to injure them, since the party to which this minority belonged was in the ascendant in both houses of the National Legislature. These leaders, without principle, without patriotism, would rather see their country—the greatest State of the world—torn into contemptible fragments each incapable of self-support and existing only through courtesy or forbearance of European nations, and would rather see this great country bleeding at every pore, her mothers childless, her wives widows, her houses in ashes, her altars profaned, than that they should forego for four short years the praise of idiots and the spoils of office.

* * * * * * * *

Well! to resume about myself, my country has done great things for me as I have shown. Would it not be the vilest ingratitude in me to desert her in the hour of need? To be selfish, what has Maryland done for me? What has Mississippi done for me? that I should take their side against a government that has supported, educated, and protected me, and "reposed special trust and confidence in my patriotism and fidelity and abilities?" But I state the question wrongly. I should not say what has Maryland or Mississippi or Kentucky done for me—I should rather say what has the factious, dissatisfied minority of these states done for me that I should prove a traitor to my trust, a rebel to my country?

* * * * * * * *

Doubtless you would like to know why I have written the above. You may think, though I hope you would judge me more charitably, that a lame conscience needs many props: that a doubting mind and infirm purpose need much show of reasoning to convince and uphold. True. But this is not my condition. I am fully persuaded of the justness of my cause, and the righteousness of my decision. My intention in the whole of this letter is to let you see that I am, with my whole heart, on the side of the Union, and to try and persuade you that I am right.

I fear, Mamma, that your heart is with the other party, with the side on which poor Guy and poorer Ott are engaged. I pity Guy with my whole heart for the choice he has made, and I would not, for the world, believe him other than honest. I know him to be pure-minded and of too ardent a soul. He has been persuaded that the South is right, and he is ready and anxious to risk his life in what he thinks is her "Cause." Poor Ott I pity also.

I should above all things, Dearest, prefer to have you with me in my opinion of this war and its causes. Women, I know, seldom reason. Where their affections lie all things are centered. It is well for the happiness of man that it should be so. But to me "Our Side" seems so palpably right, that it seems a perversion of judgment to doubt it, and I cannot bear to think of you as opposed to it.

I do not ask you to love me more than Guy. If you loved me more than Guy, you would need no reasoning to persuade you I am right—you would *feel* it, for Guy is your youngest son and it is natural that you should love him most tenderly. He is also full of noble, generous thoughts, is a manly fellow, which is a great thing in every woman's eye, and greater in a mother's! while I am old and mediocre and ugly and selfish. Guy has been at home and has endeared himself to you by his presence and by his tenderness, while I have been away, and when at home most uninteresting. I can not blame you for your choice. I approve it myself. But it is inexpressibly painful to me to think that my mother, and such a mother, should be opposed to me in this holy cause. Just look at what I have said as to the cause of this war, just look at the facts elsewhere, throw all feeling aside, and you *must* be persuaded that this government is right.

Oh Pshaw! All this about Guy and myself is silly—weak—very weak. It is, after all, only a difference of opinion and one may not be responsible altogether for one's opinion. Age and Education, association and local

prejudice, will have a great deal to answer for to pure reason and impartial judgment, when the final account is rendered. And it may be that many of us will in these find our excuses. My letter has been suggested by the tone of Hope's, which, though he said not one unkind word, seemed to me much less cordial than his former ones. I hope it was not intentional. In this is the bitterness of this unnatural strife. Not that brother should oppose brother, nor that father and son meet face to face on the field of battle, but that each should impugn the other's motive. There are many friends of mine on the other side whom I may meet in fight, some whom I expect to meet, men of the highest honor, but faulty (in my opinion) judgment, and who would look on me as something vile, while I can not help but love and admire them. There is a great deal of hatred on their side, there exists none on ours. We are fighting for a noble principle. They persuade themselves that they are doing the same. They peril their all without a cause and then rally to the cry of "Defend your firesides." Oh! the everlasting negro! Would that he were in Africa, Christianized! To me the hatred which the Southerners feel for us is horrid. If I were to meet one of my friends on the field of battle, and he should intentionally give me a death wound, I should not hate him, nor feel the least resentment but should say, "Well, old fellow, I forgive you, for you thought you were doing your duty." But if I should injure one of them, he would damn me with his latest breath. You may be sure that this difference of feeling is general in the two armies. I never hear a sailor or a soldier speak of the rebels as if he hated them: they are all anxious for a brush with them, but they seem to regard it as a jolly lark or as a matter of stern, unpleasant duty, according as levity or seriousness and thoughtfulness preponderate in the disposition of the individual.

It is past eleven at night: my fire has been out for an hour: it is a rainy, nasty night. My feet are cold, and an unpleasant sensation in my throat reminds me that I am catching cold. So, good-night my darling, and may the Lord of Heaven and Earth watch over you and protect you from all manner of harm. I kiss you, dear Mamma.

I do not know when I shall finish this scrawl.

PAMLICO SOUND, N. C., February 5, 1862. Night.

My darling Mamma:

We got underway to-day and ran some thirty or forty miles up the Sound to this place, where we anchored at sunset. To-morrow our work will probably commence. From late, but rather meagre information a severe fight is now anticipated. So much the better. I called my pilot, one of the seamen of the vessel, a North Carolinian, into the cabin this morning, and directed him to run the steamer as near the batteries as the water will allow her to go.

A vessel has the best chance with a battery when close to. Besides, I have some IX-inch shells, filled with 400 musket balls each, and a bursting charge of powder, which are terrible at short distances against exposed bodies of men.

Feb. 6.

I intended to write you a long letter this evening, bidding you a loving farewell, etc., but I am quite unwell—have a shocking cold, and feel very tired, and sleepy, so I must close. I will only say that the cause for which I risk and may lose my life is just, and I beg you to think of me (if I am killed) as dying happily, so far as I am concerned, and only disturbed and anxious as to your and Fan's fate.

I commend you both to the care of a loving and merciful Father.

Say to Guy and to Ott that their choice has been a source of great pain to me. Nevertheless, I believe that they have both done what they thought was right, and I do not blame them, nor do I love them the less. Bid them both good-bye for me, give them my love.* * * * Give my love to all at home and at Hope's. Kiss them for me and say I loved them well.

I kiss you my darling and pray that our Father in Heaven may keep you from want here, and gather you into His Fold when this life is over.

Your affectionate son,

CHARLES.

[*Before the battle of Roanoke Island.*]

PAMLICO SOUND, N. C., February 5, 1862.

My dear Fan:

It is an axiom of mine that a man should have plenty of sleep the night before fighting, therefore I intend to go to bed soon—it's now half-past nine in the evening. But my enevelopes are thin and the sheets which I wrote some days since want a cover, and I may as well put a few lines on it. So here goes. I have just closed Ma's letter. If I am killed to-morrow let none persuade you after I am gone that the cause of the Union is not just, but uphold it with all your strength. With that belief firm in the hearts of the people we are a great nation: uproot it, and presto, change, we are metamorphosed into miserable, weak confederacies of petty, jealous sovereignties, an inviting, easy prey to every greedy third-class power. Strive after true religion, Fan, with all your might. (If 'tis only the widow's mite, 'tis your all—the best can do no more.) We expect a fight to-morrow; I am tired, have a bad cold, and must go to sleep. Good-bye, dearest Fan. Comfort Ma if I fall. I am not worth mourning for; believe this and then you can persuade her.

Your loving brother,

CHARLES.

February 8, 1862.

I didn't fall, thank God.
Love to all. In great haste,

Your affectionate brother,

CHARLES.

[*Battle first day at Roanoke Island, February 7, 1862.*]

OFF ROANOKE ISLAND, N. C., Midnight, February 7, 1862.

My darling Mamma:

I ought to be asleep, as I have plenty of work before me for to-morrow, but I must tell you that I am safe and uninjured after this day's hard fighting. We have been engaged all day with a battery on shore and a small squadron of rebel steamers. I have fired to-day from two guns one hundred and ninety-six shells and shrapnel—all that I had. I have been nearer the enemy than any other vessel all day long. My boat is knocked to pieces and I have only one serious accident to report—one of my men has a leg broken by a splinter. I have four or five round shot in the hull, and four in the upper works. The Lord has been good to me; other steamers have lost officers and men. One round shot plunged directly through my magazine; had it been a shell I should probably not have written this note. The enemy fortunately fired no shell from their battery or my boat and others would have been utterly destroyed. My men are much provoked that we were not supported by other steamers. Unfortunately I expended all my loaded shell at the very time when, if I had had plenty, I would have silenced the battery. I had set the fort on fire and nearly silenced their guns when I looked about me and saw Lieutenant Chaplin close to in the propeller Valley City. I hailed him and asked him how he was getting on. He answered, "Oh! first rate," and proposed that I should take the lead, that he would follow me and we would take the battery. I sang out "Agreed," and started in toward the enemy, but had not closed more than three hundred yards when it was reported to me that the loaded shells were all gone. So I had to haul off to fill the remainder. While I was away I told the flag-officer why I came out, and he ordered me to fill the shells and follow him in, but I soon left him far behind and toward dusk had the honor to have the entire fire of the fort and two rebel steamers directed solely against my vessel. Had I not hoped to silence the battery I might have sunk one or both of the steamers, but as it was they peppered me and I did not give them a single shot in reply.

The battery was fought beautifully, the quarters of the men and officers were burning the greater part of the day, still they stuck to their guns and served them admirably. I fired myself the larger number of shots from this vessel, and can't help saying that I think the shells were well thrown.

Good-night, Mamma, and God bless you.

CHARLES.

[*Just after battle of Elizabeth City, February 10, 1812.*]

OFF ELIZABETH CITY, N. C., February 14, 1862.

My darling Mamma:

I am now here in command of three vessels, the remainder of the squadron having gone somewhere down the Sound. I have again to thank God for preserving my life and giving us victory. We met the enemy on the

10th instant, a short distance below Elizabeth, and protected by a four-gun battery. They had five steamers; we had nine, but only two or three of ours got up in time to fight the rebel steamers.

I was given the lead. I singled out the largest vessel, Commodore Lynch's flagship, the steamer Sea Bird, and ordered my pilot to run her down.

When about two hundred yards from her, and after passing through the fire of the battery and giving them some good shots in return, I fired a nine-inch shell at her, which struck her just amidships, at the water line, passed through her as if she was so much paper, and exploded a great distance beyond. I then called away boarders and ran for her, my men picking up their muskets, pistols and cutlasses for a hand-to-hand fight. When fifty yards or more from her she hauled down her flag and her commander appeared on the upper deck holding open his coat to signify that he had surrendered. I immediately ordered the helm put a-port and the steamer stopped to avoid striking him, but my men were so crazy with excitement and made so much noise that the helmsman could not hear, and so plump into her we went, smashing in her whole port bow. My men immediately jumped on board and I had to follow to restrain them from injuring the prisoners. The captain surrendered to my vessel, stated that he was in a sinking condition, and asked me to rescue his officers and men. I was anxous to secure another steamer and gave the order to back out and pursue when, to my inexpressible annoyance, I found that as we struck the Sea Bird the fastenings of our anchor went and the anchor had gone to the bottom; so we were anchored and I could not move. The men were frantic with excitement and for ten minutes I could not get any one to slip the chain, then one of the engineers unshackled it, I cut the line which fastened us to our prize with my sword, and was just leaving when her captain came to me for the second or third time and begged me, for God's sake, not to leave his men to drown; so to save them I reluctantly gave up the pursuit. While I was at anchor engaged taking the prisoners from the sinking vessel two small rebel steamers ran around me, firing with musketry at my men. I could have sunk them both with one gun each, but my men were so wild that I could not get them to their quarters at the great guns. One of these steamers came up on my starboard quarter, only ten or fifteen yards off, where there was not a man but myself, and tried to train a great gun on us. I repeatedly called the men to their guns, but they would not come, so as a last chance, for I felt that if the gun was fired I was destroyed, I drew my revolver, a small-sized Colt's, and fired at the captain of the enemy's gun. I fired three or four shots with deliberate aim and saw the captain of the gun and the man on his left fall; whether I hit them or not I do not know, I only know that the gun was not fired.

The other little beggar came on the port bow, and her officers stuck muskets and pistols out of their room windows and fired at my men and officers. I had to use my revolver on her also. One of the rebel steamers, commanded by a very smart officer and good friend of mine, escaped. She might have been taken, but she was between the town and a pursuing

steamer, and our officers would not fire for fear of injuring the property of the citizens. Yet the secessionists set the town on fire as they left. I would have captured Parker but for the fact of my anchor being cut adrift by the collision with the Sea Bird. As soon as we passed the battery we had an enfilading fire on it which the rebels would not stop to receive, but ran like good fellows, led by Lynch, who had given his vessel to his second in command and taken charge of the battery, in order that he might make his escape when the fire became too hot for him. I captured forty-two prisoners on board the Sea Bird, seven of them officers; one of them an old acquaintance of mine in our Navy, and who was glad to fall into my hands; another, an assistant surgeon, from Kentucky, E. Holt Jones, who knows all the people in Louisville whom I know. We released them all on parole, and I told Jones to remember me to all the good folks in Louisville, where he hopes soon to be. I sent Lynch his cloak by Dr. Jones. I do not know whether or not he will thank me for it.

I had two men killed and three wounded slightly. Singular to say, both of my men were shot directly under the eye, and killed instantly. One officer was shot in the face, but having a hard cheek the ball glanced and did him no injury. Another officer received a slight flesh wound in the leg. Two of my prisoners were wounded seriously, and one of them mortally by the premature discharge of a gun. One of the rebel prisoners, Lieutenant Cooke, formerly of our Navy, told me that his men had orders to fire at the officers. I hold him that I had given the same orders to my soldiers, for I thought his *men* were half inclined to come over to us. I think now their soldiers and sailors are nearly tired of the war. My prisoners (the officers) thanked me when they left for my kind treatment. I gave them plenty of whisky to console them and surrendered my cabin to them. Whisky, by the way, is a scarce article here; it sells at four dollars a gallon and can hardly be found at that price. The poor here are suffering severely. We have had to give away some provisions to save them from starving. I gave a man yesterday one of the blankets from my bed and a quilt which Dr. Jones left aboard, and which I think came from Lynch's cabin.

I believe I might have talked over some of the prisoners; they would have been easily persuaded; but delicacy forbade me to approach such a topic. Yesterday four of our steamers went up to Edenton and destroyed some great guns, the troops flying as we appeared in town. While destroying the guns an old lady came up and claimed my protection. "Protection against what or whom, Madam?" I asked. "Why," said she in great astonishment, "Are you not going to burn the town down?" I told her we came there to fight those in arms against us and to destroy arms, etc., and not to injure helpless people, but it was only after repeated asseverations of our good-will toward the people that I could induce her to leave me.

I had the principal men of the place before me and made them a strong Union speech, to which there was no response, probably because my men were not very far off, but *I think* because it was unanswerable. Ah, a war is the thing to develop one's talents! I never before dreamed that I had

the impudence to mount a platform in the open street and make a political speech. Whether my arguments convinced them or not I do not know, but I do know that the price of turkeys was raised in an hour from $1.75 to $4.00 a pair. We brought away six bales of contraband cotton. I forgot to mention that in addition to my man-of-war prize, I captured on the 10th a schooner, and another night before last, loaded with corn bound to Norfolk, worth about four thousand dollars. I have been engaged all day destroying gun carriages and a gun. We have taken or destroyed since we left Roanoke some thirty great guns, beside a large number of muskets and other small arms. The rebel steamers had rifled cannon far superior to ours at long range, but we sold them by coming to close quarters. Though we have not five hundred men in our nine steamers, rumor has it that we landed ten thousand men at Elizabeth City and as many more at Edenton. The rebels have a great scare on, and if we follow up our victories promptly the whole State is ours. It is said that we have much severer fighting to do than we have yet done. The Lord has kindly protected me from all injury so far, and I pray that he will keep me from harm in our future battles, as I pray every night for you and Fan. It is late, dearest, and my fire is out. Good night. I kiss you, dearest Mamma.

Your affectionate son,

CHARLES.

U. S. S. COMMODORE PERRY, NEW BERNE, N. C., March 15, 1862.

My darling Mamma:

We took this place yesterday after some severe fighting on the part of the Army; our part was easily done. The loss of the Army is large; the Navy lost no one.

The defenses were immense, and I can only account for our success by believing Providence to be with us.

My boat was ahead during the fighting, but after the hauling down of the rebel flags I grounded in attempting to pass the barricade which the rebels had placed in the river, and was last in at the triumphal entry. Nevertheless, I succeeded in capturing a Confederate schooner, unarmed but valuable. Tell Fan to destroy the copies of the reports I sent her to keep. I altered my report.

I am sore in every muscle. It has been a great effort to write this.

Your affectionate son,

CHARLES.

P. S.—The rebels, as is their custom now, in their flight set fire to the town in many places and burned the fine railroad bridge over the river; the latter was to save themselves from pursuit.

As soon as we anchored I took a boat, went ashore, pressed every man I saw, white and black, into service, manned the engines, and succeeded in allaying the fierceness of the flames. This was done without orders and in answer to the prayers of the poor people who begged me for protection. Yet we are called Hessians, vandals, and all other vile names.

Good-bye.

U. S. S. COMMODORE PERRY,

ELIZABETH CITY, N. C., 10 h. p. m., 28th April, 1862.

My darling Mamma:

The Commodore has been here for some days past and I have spent several hours of each day on board of his vessel talking over plans of attack and defense, etc., etc.—all nonsense. But my time has been so much engaged that I have had no opportunity to write you. Time flies even while one talks nonsense. I wish he would go away, though he's a good fellow and thinks I am a trump.

You may judge how much he esteems me, when I tell you that I have command here of eight or nine steamers, with a chance of meeting the enemy, while four officers, my seniors, command at different points, only their single ships. Or, rather that was the case for several weeks, but now the second in command has gone home on sick leave, the third to get a new steamer, and the other two remain as stated above. The reason of the beggars not complaining is that they think I will be made a commander—another that they like me.

I do not expect promotion, but if the enemy will only send some iron-clad gunboats down Dismal Swamp Canal while I am in command here, I think I should soon stand a fair chance of going up to next grade.

Remember, Mamma, all this is *entre nous, sub rosa,* etc., etc. The above is terribly egotistical, but I am pleased with my egotism when writing to you—for to you I like to write my thoughts as they are, and not as other men hear them expressed. Though I fear of late I have spoken my thoughts rather too plainly of several persons, from any one of whom I might receive a challenge. But do not be alarmed, that folly is dead with me. I don't think I should fight another duel. Nevertheless, I went from here the other day to Roanoke Island to take a colonel in the Army to task for a disagreeable remark with every prospect of a duel ahead. Some days since, I arranged an expedition for a certain service to South Mills. Five regiments were sent up, and after whipping the enemy, retreated during the night, on learning that he was reinforced. The enemy thought that they were surrounded and retreated also. The expedition retreated without having accomplished its object. I early received the news of the enemy's running and hastened down the river to bring back the army—but too late—they had left two or three hours before I arrived. The night of their arrival here, I was in a small boat, landed them all, men, horses, carts, and field pieces, worked all night long, and at daybreak received word from the general in command that it was absolutely necessary to destroy a certain bridge. I got underway in five minutes, ran up the river and tore away the bridge—ran right through it with my steamer. I then pushed ahead with the small steamers without orders, and in one of them, after immense labor, got within a couple of miles of the battle-field, when an order reached me by a rowboat from the commodore to have my forces out of the river by nightfall. This was impossible. The river was so narrow that after receiving the order I ran a quarter of a mile ahead to get a chance to turn, found I could not turn,

and had to drop down stern foremost upwards of a mile before I could turn a boat ninety feet in length. I did not get down to my own vessel till next morning, when I learned of the retreat of our forces and received an order to remain in the river till noon to prevent an advance of the enemy on the army while embarking. While here I picked up two officers and forty soldiers who had fallen down, exhausted by the long march, and who were very glad to be saved from a Richmond tobacco-house-jail. I planned the expedition, landed the forces, and covered their retreat. And after all this a miserable colonel remarked to one of the subordinate naval officers who was engaged in embarking the runaways, that he was ——— *tired of doing the Navy's fighting for them.* As soon as I heard of the remark I asked permission of the commodore to go to Roanoke Island (I had some duty there also, and combined duty and pleasure). Leave was granted and away I went. I could not find the officer who made the remark, but I said to Colonel Hawkins, who commands the post, that in my opinion, the person who made that remark was much indisposed to fight at all—in any cause—and that he was an ass, all of which I desired him to repeat to the person offending.

* * * * * * * *

On the morning when the bridge was destroyed, as I moved up the river, I caught some of the enemy's cavalry napping: the men were in a house, about three-quarters of a mile from the river bank, and their horses in the stable near, some men just saddling their beasts when I caught sight of them and sent some IX-inch and 30-pounder shell into the house and into the stable. It was a beautiful sight to see them in their bewilderment run first to the stable and then away again without their horses. I fired every shot myself and I know they told. I do not think many were hurt, but I struck the house beautifully. They do not send their troops quite so near now. At present the town is held by the naval forces without a single man being ashore, notice having been given the enemy that if he entered the town we should fire on him. We had allowed him to hold it and spy out our movements quite long enough.

Apropos of spies, these secession troops, I fancy, think nothing is known to us of what they do on shore; but they scarcely make a movement of which I am not informed and sometimes even know those which are contemplated. I had a man on shore the other night who went into the camp and talked with the soldiers unsuspected. A few nights after that he was again on board of my vessel, and in a few nights more was here guiding our troops against them. So much for keeping a good lookout on the enemy.

It is now 12 o'clock and time to say good-night.

* * * * * * * *

Remember me kindly to all who care for me. I do not wish to hear anything more about Guy's being in a loyal state, unless he is a prisoner or comes to deliver himself up to the United States authorities.

If I was at home and knew of his skulking about the city, seeking

recruits or acting the spy, I should have him arrested though he were shot for it. I love him but I love my country (or myself—I don't know which it is) more.

Again, love to all. Ask Miss Sarah to write to me. Write yourself, frequently, and make Fan write often.

May God bless you, dearest, is the constant prayer of

Your affectionate son,

CHARLES.

U. S. S. COMMODORE PERRY,

PASQUOTANK RIVER, N. C., May 13, 1862.

My dear Mamma:

* * * * * * * *

I've been moving armies and fleets, running off negroes, buying up information, and been so busy withal for the last few weeks that I have not had time to be sick, and am really much better. Only last night I started off into the country with 120 men, went back some three miles from the boats, taking from the houses on the roadside all the men and carrying them with us, to prevent them from giving information to the rebel troops in the vicinity of our movements. Arrived at our destination, the house of a farmer where was concealed the apparatus stolen from one of the Government lighthouses, the building was surrounded, and he was aroused and summoned to deliver it up to us. He made no objection to giving up the plunder, but begged me to prevent my men from insulting his wife, who was in a delicate condition, so called, I presume, because women are then, by a kind provision of Providence, most robust. I placed a guard over the house with orders to allow no one to leave it, and none of my people to enter. We then pressed his carts into service and with two others pressed from the neighbors we started back, making the farmer and a negro drive the carts. We were gone from our vessels eight hours, and not a Southern soldier knew anything of our doings till next morning, though our farmer driver, who was a warm secessionist, cried "gee" and "haw" to his oxen loud enough to wake the dead. My men were greatly disappointed at not meeting a newly-raised cavalry company which generally scours the country round about the scene of our operations at night. Maybe the scamps did know of our doings, but deeming prudence the better part of valor preferred to keep out of sight.

Our secession friend was so surprised at the kind treatment he received at our hands that he offered, unsolicited, to bring down any part of the apparatus which a more patient search in the daytime might reveal. We marched, going out, three miles in quick time, and I think I was as much fatigued on our return as I should be after three months on shore from a march of twenty-five miles.

PLYMOUTH, ROANOKE RIVER, May 16, 1862.

Since writing the above I have taken possession of three rebel towns, and captured a rebel steamer loaded with provisions for the Southern Army and the church bells of this place, which were en route to Richmond to be cast into howitzers for the rebel Army. To-day I captured a rebel major for violating his parole and distressing Union people. It is very pleasant to witness the childish delight of these poor people at being rid of the horrid despotism which has ground them into the dust for months past. To sell us an egg or a fowl is made punishable with death. If a man dares to say he likes the Union as it was, he is shut up in prison far from his family and tried for treason—sometimes executed without trial. Thank God, our time has come now and I intend to improve it. I shall arrest every prominent secessionist near the water courses of Albemarle Sound. With four boats I penetrated yesterday to the head of the Cashai River, where none but the smallest vessels have heretofore been. The people could scarcely credit the evidence of their eyes when we appeared off the place. I found a quantity of Confederate stores, which I ordered distributed to the poor. I at first intended burning them, but a poor widow begged me with tears in her eyes not to set fire to the house containing the stores for fear her home would be destroyed. I said, "Do not be uneasy, Madam, rather than burn your dwelling the Confederate Army should have the stores." As I turned away she said, "God bless your cause, sir." And I thought the widow's blessing of more value to the cause than many times the stores.

I remained at Windsor until near sunset, and to the surprise of the people managed to turn my steamers; they all said the river was not so wide as the boats were long.

Some silly fellow said if we staid twenty-four hours there we should have some soldiers to meet us, on which I told the people if they would get us up a dance I should remain all night. If the soldiers had wanted to meet us they had the chance, for I moved only a mile down the river, when it became so dark that I had to tie up to a tree for the night.

While going up we frequently saw the second steamer ahead of us going in a directly opposite direction to that we were steering, and while she was in a direct line not fifty yards from us, by the river she was four hundred, sometimes less, sometimes more. We could touch at the same time the trees on both banks and had to cut away limbs which projected over the stream. These North Carolinians now think we can run on a heavy dew or a moist sponge.

To-night I received information that some 200,000 pounds of bacon for the Confederate Army was stored near here and being rapidly removed, also that a large quantity of wheat was at a mill hard by, waiting its turn to be converted into flour for the same delightful gentlemen. To-morrow, God willing, I shall destroy both.

To-day I took the first drink for eight years. The doctor has prescribed for me a glass of Scuppernong wine three times daily. I do not know that I shall take it, though I fancy it might do me good.

* * * * * * * *

Some Union people here said to me to-day, "Only stay here and protect us, sir, and we will send you all the poultry, eggs, milk, fruit, and whatever else we have that you want." One man said, "I do not wish you to pay me anything." "But," I said, "I desire to pay, sir, for whatever I get." He declared he would take no money from me, that he had plenty—silver and gold. He said when Sumter fell he knew what must follow, and he had never received any Confederate money. Confederate notes will scarcely go here now at all. The people here are in my power, for I have possession of the rivers and can cut off their supply of fish, on which they principally subsist. I have informed the mayor of this place that if reliable proof is brought to me that the fish reach the Confederate Army I shall seize all the seines and break up the business.

What a glorious fight our Navy had near New Orleans. Beside it, our operations here sink into insignificance, though we have taken two hundred guns. A good friend of mine there commanded the Cayuga. The papers will tell you how she was handled.

The Navy, thank God, has performed its part well in this war. I seized in the customhouse here yesterday the apparatus of a light-boat which the rebels had stolen. I've written enough. Good-bye.

Your affectionate son,

CHARLES.

U. S. S. COMMODORE PERRY,

OFF PLYMOUTH, N. C., May 28, 1862.

My darling Mamma:

* * * * * * * *

I have tried to do everything for the Cause here, but obstinacy, prejudice, and laziness on our own side have defeated nearly all. I feel confident that I could have this State in the Union at this time had I had the distribution and control of the Army and Naval forces down here. I have written and recommended till I am tired and disgusted, and I only wish my letters were public instead of unofficial. If my advice had been acted on we might now have several loyal regiments of North Carolinians in the field. I have begged for arms, and promised to raise men if they could be armed and equipped. There are plenty of muskets and plenty of ammunition lying idle, but for some unknown reason the good people of this State cannot be supplied. One regiment of North Carolinians would be worth three regiments of Northern soldiers to our cause, by reason of the good influence they would exert on their families, their friends, and the people of their State.

But, bah! I'm disgusted and can't write more. Good-night.

Your affectionate son,

CHARLES.

U. S. S. COMMODORE PERRY,

PLYMOUTH, N. C., August 4, 1862.

My dear Mamma:

The enemy has been threatening to come down and destroy this town lately, so we have been on the *qui vive*.

As they delayed so long the execution of their threat, we went up after them.

We had a running fight of an hour, the rebels firing with muskets from a high bank where they were concealed.

They killed two of our men and wounded eight or ten. They report none injured, but they buried six men in Williamston the next day, whom they reported as belonging to us.

I landed at Hamilton with one hundred and fifty men and a field piece and offered them fight, but they declined.

I have been twice since then to Williamston getting an opportunity to throw some shells at the rebels from a distance, but they skedaddled on our near approach.

The rebel cavalry skulk about here to capture our officers who wander outside our pickets, but I drove twenty miles before breakfast two or three days since unmolested.

I was chased into town the other day by some of our own cavalry visiting from Washington, N. C., whom I mistook for secesh. The colonel, an old friend of mine, had a hearty laugh at me.

I think I was never in a more unpleasant position for fifteen minutes. I had a lady and infant under my charge, the former very much frightened. I was very anxious to give the alarm to our troops in town, anxious, of course, not to be captured, and yet could not leave the frightened girl. When we reached the nearest picket, the cavalry, yet awhile believed to be secesh, were not more than five hundred yards behind me.

Your affectionate son,

CHARLES.

U. S. S. MIAMI, PLYMOUTH, N. C., April 12, 1864.

My dear Fan:

* * * * * * * *

The rebs promise to fight us this week with the ironclad ram, for which I have been watching so long, and eleven thousand men. I wish our garrison was one-third as strong. I don't know whether the scamps will come or not, but will be prepared by day after to-morrow to give them a good fight so far as the boats are concerned. The long-shore people must look out for themselves while we afloat destroy the Sheep—the name we've given the ironclad because we thought it would not show fight. It will prove to be a formidable antagonist, and we will have our hands full to whip it. Fortunately it will not be many minutes after her appearance before the result of the passage at arms is known.

I wrote the admiral to send me some good shot to penetrate her armor and I should need no more boats. Fact is I look on her as peculiarly my own. I am prepared for a very desperate fight, and think unless Fortune frown outrageously on me my arrangements will defeat her.

The plan to fight her was the result of long thought and some anxiety.

While I was lying sick abed she was reported coming down the river. I was awake and trying to read, but was not satisfied with my preparations, and read without understanding, thinking all the while of her. At 4 o'clock in the morning I had found what I wanted, and turning to a friend who was smoking by my bedside, and who was formerly in the Navy, I gave him my plan. He expressed his delight and his entire confidence of success. The next day it was made known to several officers, and its advantages were so evident that all immediately approved. I feel gratified at having received the happy thought. I think there is no instance on record of a fight on the plan I intended to pursue.

In fifteen minutes after we get to close quarters my commission as commander is secured or I am a dead man.

I am aware that the result of these rests with God. I shall not fail to ask his aid, but do not think the rebel cause so good that we have any reason to fear the end.

* * * * * * * *

Your affectionate brother,
CHARLES.

[*Letters from Flusser to Davenport.*]

U. S. S. MIAMI, PLYMOUTH, N. C., April 17, 1864.

Sir:

The enemy are about the town. They have fired on us to-day pretty lively. The Ceres, (with her usual bad luck), had one killed and several wounded.

I expect an attack about daylight to-morrow. I feel confident of success, so far as *we* (the navy) are concerned. My plan of defense prevents me giving the army what aid I should wish before the ram is whipped. You need not be uneasy as to the result. I have written the admiral as I write you. Very respectfully, your obedient servant,

C. W. FLUSSER, *Lieutenant-Commander.*

Commander H. K. Davenport,
Senior Naval Owcer,
Inland Waters of North Carolina,
U. S. S. Hetzel, New Berne, N. C.

Over-private—

I wish you could be here to-morrow to see as nice a little fight "as ever you see."

[*Flusser's last letter.*]

MIAMI, PLYMOUTH, N. C., 18 April, 1864.

My dear Davenport:

The army has been engaged with the enemy, off and on, all day. About sunset the rebs advanced along our whole line but were driven back. They were obstinate and continued to fight till near 9 o'clock. The Southfield and Miami took part and the general says our firing was admirable.

I am fearful for Fort Gray. The enemy has established a battery of long-range guns above it, with which they would sink all our boats if we went near enough to the fort to fire grape and canister into the enemy's infantry. They sunk the army steamer Bombshell to-day, temporarily under command of Ensign Stokes, who fought her well. I gave the army to-day one hundred projectiles for 100-pdr. Parrott. Please send powder, shot and shells for that gun, for IX-inch, and for XX-pdr. Parrott. The ram will be down to-night or to-morrow; she was, just after daylight this morning, foul of a tree six miles above Williamston. I think, if she does not stay under cover of their battery established above Fort Gray, that we shall whip her. I had to destroy the obstruction in the Thoroughfare, as the Whitehead was above and could not run by the battery placed below her on the Roanoke.

I have written the admiral. The 85th redoubt repulsed three obstinate assaults, but the enemy remain near it.

In great haste, yours sincerely,

C. W. FLUSSER.

Commander H. K. Davenport, &c., &c., &c.

Remember me to your officers. Did not know this sheet was blotted till I wrote the other side.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

THE TRUTH ABOUT NAVAL ADMINISTRATION.

By NAVAL CONSTRUCTOR T. G. ROBERTS, U. S. Navy.

Foreword.—This paper was prepared about February, 1904, and statements involving time refer to that date.

Since that time, the general staff, as a legislative proposition, has apparently died on its own merits, and not because it lacked for representation.

The scheme herein presented is not as ideal as if made out of new cloth, but is practicable in that it utilizes personnel already on hand, and distributes employment in accordance with present practice as far as consistent with the essential feature of consolidation.

In connection with this paper I wish to cite two ancient arguments, and answer them in order, viz.:

(1) They say, "that after consolidation, the duties must again be subdivided among the various experts, which is the same practice as now; hence, nothing will be gained thereby." "That such a condition already exists in a commandant and his heads of departments, and you will only get back to where you started from."

This fallacy is simple, although it has been a puzzle for amateurs during many years past. It is a fact that personnel in any office must be assigned to duties in accordance with individual aptitude, and even subdivided to suit the class of work. Such is found in any business office anywhere. The flaw lies in the failure to perceive the difference between a single office and a single set of account books, executive orders, shops, and workmen, and a collective industrial establishment of six separate offices, each a power unto itself, duplicating each other and making work for each other. The difference in the application of expert ser-

vices in the two cases is immaterial, and cuts no figure in the *governing* considerations. The main thing is to have an expert head of the single industrial department who will bear the responsibility for the cost of the work. A commandant must exercise military control over the whole naval station, one unit of which should be the industrial department, the other units being the naval hospital, marine barracks, pay office, general storekeeper's storehouses, receiving ships, observatory, pharmacy, ships in ordinary, and ships in commission under repairs, respectively. By this arrangement a commandant would have his hands full doing precisely the same things as now, and would have the same control as now; the only change being a consolidation of units under his control.

(2) They say, "it is a good thing to have separate bureaus, since professional rivalry induces excellence in results."

That is an argument whose greatest vogue existed in the days of the ante-amalgamation line-engineer wrangles. Professional disputes in navy-yard industry have never been recommended as a time and money-saving device. No well-regulated establishment in civil life would permit for a moment a controversy-breeding state of affairs among its employes. That would be considered the first signal of collective inefficiency.

Finally, I wish it clearly understood that in this paper my criticisms do not apply to bureaus, or boards, or departments, or individuals, as such; none of the above deserve criticism from me in this connection, it being evident that each must operate as best it can under the system in which it finds itself. The fault is in the system as a collective institution, and I hope therefore not to be misunderstood.

INTRODUCTORY.

There seems to be a spirit of dissatisfaction all over the country with the alleged shortcomings of our methods of naval administration, and at the present time the available testimony from all sources tends to give a confusion of ideas that is apt to lead us astray should we make a wrong diagnosis of the case.

First and foremost, there is a demand on the part of congress for greater economy in navy-yard industry. This has been brought about by the demand of labor unions to have naval vessels built in navy-yards, and the actuating motive lies in the fact

that the shipbuilding tradesmen prefer to work in navy-wards, where they have better pay, higher ratings, and shorter hours; and where the physical strain and nervous tension are less than in private shipyards engaged in the necessity of making profit. Furthermore, the rules of labor unions are more nearly adhered to in navy-yards in matters governing the limits of work in its distribution among different classes of mechanics. The private shipyard is bound, by the price of its existence, to disregard the rules of labor unions to the farthest limit in the matter of employing the least possible skilled labor where unskilled labor will suffice, and of utilizing the maximum limit of boys and apprentices. No shipyard ever adopts all the rules of the labor unions, but disregards them as far as is profitable and practicable. Navy-yards are more sensitive to the demands of the worker because they are part of a political system of government, and the labor vote is all powerful. The navy-yard is the Mecca of the shipbuilding trades, and the personal interests involved would transfer the labor of building naval ships from private to government yards.

This pressure brought to bear upon congress has caused an unprecedented exposure of government methods in which it has been proved beyond question that navy-yard work is more expensive, and requires longer time, than shipyard work. The time and cost of building the Maine, Texas, Cincinnati, and Raleigh, are familiar to the public, and that of every article of furniture or equipage manufactured in a navy-yard is available proof of the excessive cost which nobody at this time can deny.

The comparative figures are positive evidence that the fact exists. The fuss being made in various quarters has, thus, some foundation in fact. Now as to the cause.

Testimony of the highest and the lowest authorities has laid the cause at the door of the administrative system of navy-yards, which is conceded to be cumbersome, unwieldy, and expensive, due to the divided authority distributed among several heads of departments. The foregoing are established facts proved by the superabundance of evidence that has accumulated for many years past. The circumstantial evidence with which the congressmen most interested have become impressed is found in the duplication, and triplication, and quadruplication of separate plants within a navy-yard, each department being, or endeavoring to be, complete in itself and independent of the others. No amount of conflicting

testimony can prevent the inevitable conclusion which American men of intelligence must form in this epoch of business combinations. There is no doubt about the cause of the present state of affairs; the only problem is the remedy.

The foregoing conditions have been brought to the front entirely from considerations outside the service proper, but in the midst of this unsettled state of feeling comes a hue and cry from within the navy by the advocates of a general staff which, they say, is warranted to cure all the existing ills. It is claimed that a permanent body of line officers, in addition to those already on hand, should be established within the navy department for the purpose, primarily, of furnishing a "mere civilian secretary" with hand-picked knowledge of strategy to direct the fleet and "wield the navy as a weapon," and incidentally to coerce the multi-bureau system into uniform ideas and economical habits by the power of military rank and authority. I think that is the gist of it. The purpose seems to be to confine these operations to the mental and paper machinery inside the Navy Department at Washington. The *motif* of this campaign, with high rank and emoluments dangling around it, has been brought into question by the current literature on the subject.

The foregoing facts constitute the summary of the present conditions as they exist, and it shall be my purpose to analyze the situation from its various bearings, and endeavor to find a remedy.

NAVAL ADMINISTRATION.

It is necessary to recognize, in the first place, that three separate and distinct methods of administration are found within the operations of the Navy Department, comprising what we understand as naval administration. These three divisions may be classified under the heads, (1) Political, (2) Military, and (3) Industrial.

The political system is represented by the head of the Navy Department, who is, and ever will be, a civilian, because the spirit and essence of our government is based on a subjection of the military to the civil institution.

The political administration as above classified is frequently referred to as civil administration, which it is; but so also is industrial administration, and to avoid confusion, the foregoing classification will be adhered to throughout.

Military administration refers to that under the line officers,

who alone are eligible to the supreme command of a ship, a squadron, or a fleet. Line officer means a naval officer in the line of promotion to such command. The functions are purely military, and the purely military field of operations finds its most correct example on board a ship or in a fleet. Shipboard administration will be considered the exact expression of military administration in the navy. The strategy and directing power of a fleet are included in the same definition.

By industrial administration is meant that portion engaged in the production and manufacture of a ship and its accessories, which may be more closely defined as those departments engaged in procuring materials and operating civilian mechanics in producing the ship. Navy-yard administration is industrial in all that applies to workshop and civil employe as found to exist in the analogous institution of a private shipyard; being military only by virtue of the supreme authority vested in a commandant.

(1) POLITICAL ADMINISTRATION.

The Secretary of the Navy represents the political administrator. Politics is our method of securing government of the people, by the people, for the people. The politically successful man is one selected by the majority as their representative because of personal attributes most acceptable to the people, whose actions the people believe will be most agreeable to themselves, concerned. He is, presumably, the embodiment of our form of government, and to his authority the military and industrial considerations must bow.

The political feature finds its expression in various ways in naval administration over and above all other considerations contemplated in the military establishment as laid down in the navy regulations. If a ship must be overhauled and repaired and two navy-yards desire to get the work, the workmen's representatives that clamor loudest usually get it, that being the will of the majority that care anything about it. Within the service the opinion always holds that such matters, as all others, should be determined by the absolute merits of the case, regardless of clamors. The military administrator must determine his actions by merit, that being the root and foundation of his education and training, and he cares little about the will of the people where his position is not influenced by such a regard. A naval officer is not in the best

position to be a political administrator;—he can read from the mercurial barometer an approach of a storm at sea, but he is handicapped where it comes to feeling the pulse of the people from the touch of the political barometer.

Political administration finds its way into the service in shifting ships and work from one station to another, in shifting personnel in like manner, in the location of navy-yards and naval stations, in appropriations for new buildings and new expenditures of all kinds at the various stations; it determines whether vessels shall be built or repaired at navy-yards. In time of war political considerations divert naval vessels from the fleet to patrol the coasts in the vicinity of frightened political communities. It has given high position to political favorites, and has determined the command of ships and squadrons. Sometimes it goes even farther and influences the actions of naval boards in their duties under the regulations. Boards have been known to have their recommendations returned for revision until they meet the political desires, or another board may be called to reverse their actions, and so on until the desired results are attained. This operates to promote personnel in some cases, to discharge or retire it in others. It operates sometimes to increase the pay of the navy-yard mechanic. Its existence has been alleged in political contests against non-partisan shipbuilders in the trials of vessels, and it shows itself in various forms in the distribution of contracts for new ships, and is constantly at work in the purchase and acceptance of all sorts of materials for government use. The head of a government department is sensitive to the representations of the people; if he is not, some one soon takes his place who is. Of course there have been abuses as in every other department of life, but a good administrator knows enough not to try to reform the people, or the political system of which he is a part; he does his part best if he recognizes facts as they exist; and he concedes to political demands, if they are logical, where it makes no material difference otherwise, and where it does not interfere with the object for which his institution was created.

I am not attempting to lay down rules, but merely to place an estimate on what appears to have been the guiding features of political administration from the evidences that have come to notice in the past.

Is such a political government an abuse? Should the people

rule the people? If the public's wishes be disregarded, the government becomes autocratic by definition, and how else can their wishes be made known except through their representatives? If reform, who will attempt it, and how? Would the creation of a general staff, or any other sort of mechanism, inside the Navy Department destroy, limit, or influence in any way the politics of the head of the department as it applies to the military and industrial establishments? It may as well be conceded, in the light of history, that the political administration, whatever its good or evil, will remain untrammeled as long as our form of government exists.

(2) MILITARY ADMINISTRATION.

Only on board a naval vessel does military discipline hold complete sway. The order of the captain is the law and must be obeyed without question, argument, or appeal to a higher power. The captain must confine his actions to the limits prescribed by law, but inside those limits he can cover almost any sort of overbearing conduct toward those beneath him, officers and men alike. He cannot strike them, or punish them physically beyond the lawful limit; but he can harangue them and institute such a personal bearing toward them as to punish them mentally beyond degree. There is no appeal from an order, which must be obeyed with alacrity whether right or wrong, and he who refuses classifies his action with the mutineers, the limit of which, in grave cases, is death. He who answers back goes to prison, but he cannot resign or be discharged. I am merely specifying the limits in order to distinguish more clearly between military and industrial administration and to show that a trained military administrator is as different from an industrial, as from a political, administrator.

Our bureau system is represented in miniature on the ship. The captain represents the bureau of navigation which directs his own actions and the movements of the ship. Although the other bureaus are represented, not one of them has any right or power of appeal that would modify in the least the perfect and absolute control of the directing administrative bureau, and its captain, in the wielding of the ship as a fighting machine. In this point it differs from navy-yard administration, as we shall see presently. The executive officer represents the bureau of construction and repair, and the ordnance, equipment, medical, pay, and marine officers, represent the corresponding bureaus. In the operation of

the bureau system in the *use* of tools, stores, etc., there are no conflictions; they are used where needed indiscriminately by shipboard authority or without. If one bureau's machine breaks down another bureau's force repairs it, if more handy. The bureau representatives themselves are not expert in the lines of demarcation and cognizance of the bureaus, a line officer representing a staff bureau, and there is no provision for appeal beyond the ship if one should so desire. In other words, the captain has complete control of his ship and all her accessories, and the bureau system divides the duties of officers into a convenient distribution of the work. Military efficiency is attained by drilling, innate intelligence, alacrity in obedience to orders, and the good example and rigid discipline that must be maintained by the officers at all hazards. Admiral Farragut laid down a military rule for all time when he said to his officers, "Whatever is to be done must be done quickly." Shipboard efficiency consists in preparedness and alacrity. It has little to do with dollars and cents. Military economy is exercised in taking care of the materials and avoiding waste, in about the same way as one would take care of a new suit of clothes, or would eat sparingly of his provisions during a long journey; it has nothing to do with saving money by a judicial distribution of the laboring forces, to obtain the best returns for the money expended, which forms the essence of industrial administration. On the contrary, shipboard administration contemplates expending the maximum amount of labor in order to fill up the time. Those who have been to sea know the monotony of having nothing to do, which tends to generate the spirit of unhappiness. Hence the sailor's proverb that the best commander keeps his crew happy by keeping them busy. Happiness is healthy for the mind, labor is healthy for the body, and these essentials permit of the attainment of military preparedness, alertness, and efficiency. Industrial economy is a different profession. It is a law of humanity that a man is most proficient in the line of his ambitions. The highest ambition of a line officer is to command at sea. In that position the eyes of the whole world may be turned on him in war, and his name may be in every mouth. He may bring honor or disgrace to his country. He must be a specialist in the strictest sense, but not a general practitioner. Besides familiarity with the methods of wielding the men and the tools at his disposal, he must be familiar with strategy, international

law, naval history, navigation, and tactics. None can afford to be an indifferent expert in these branches, for a single blunder in one might lose all. No profession in civil life forms any sort of analogy or comparison to that of a line officer, and it is a matter of current belief that the easy habits and disciplinary notions of naval training unfit an officer for civil pursuits; and it is likewise apparent that civilians never have been, and cannot be, eligible to the position of a line officer, without the necessary course of training. It requires no analytical mind to discern the irreconcilable differences between industrial and military administration.

(3) INDUSTRIAL ADMINISTRATION.

The peaceful arts of the shipbuilding mechanics comprise the industrial features of naval administration, as is represented by a navy-yard. The business of such an institution is to manufacture, repair, or assemble the vessel and her outfit. The production of the vessel belongs purely to civil industry, being the product of the shipbuilding trades under the cognizance of labor unions. The pay of a sailor is merely nominal in comparison with that of the mechanical tradesman, which furnishes an opening for a considerable loss of funds unless the quality of administration secures the best combinations in outlay of plant, in the purchase and handling of materials, and most important of all in the distribution and handling of the difficult and very expensive labor that fills up the navy-yards. The workmen may not be tongue-lashed, nor put in the brig, but they may be discharged if the administrator has a good case.

Now let us examine the operations of the bureau system as it applies to the industry of a navy-yard. The local representatives of bureaus comprise the corresponding Departments of Construction and Repair, Steam Engineering, Equipment, Yards and Docks, Ordnance, Supplies and Accounts, and Medicine and Surgery. The Bureau of Navigation is represented by the commandant.

The division of work assigned to each bureau, or department, is a development of the natural and convenient divisions that existed in shipbuilding when the bureaus were first formed in 1842. The original Bureau of Construction, Equipment and Repair controlled practically all the industry that was required to

build a ship; it included all that is now represented by the three bureaus, Construction and Repair, Equipment, and Steam Engineering, the latter subdivisions having been made in 1862 during the stress of war. Had the construction bureau not been thus subdivided there would be a different tale to tell about the cost of navy-yard administration to-day. But no one could have foreseen the effect at that date. The subdivisions were natural ones inasmuch as the chief constructor, before that time, had an engineer as assistant to look after the steam machinery of the new motive power.

The wood shipbuilder viewed with suspicion the advent of steam, and the motive power of the future passed out of his hands to those who were willing to master it. A ship was then a simple affair and there was no question as to where the propelling machinery left off and where the ship began. The equipment bureau undertook to relieve the construction bureau of assembling movable articles not strictly a part of the ship, but corresponding more nearly to the furnishings, such as sails, rigging, anchors and chains, the electrical outfit, and the like. With the changes that have come about in modern shipbuilding, the steel ships of to-day, with their complex machinery, have merged all professions into one. The wood shipbuilder, as represented in the modern shipwright, has been driven almost out of business. His cognizance included the whole vessel in 1842, while now he is limited to the decks, and the outside sheathing if any. The steam engineer finds himself replacing his own auxiliary machinery with equipment motors, and he has to tolerate rival steam engines that form essential portions of the equipment and construction machinery. Likewise the equipment bureau finds rivals with electrical machinery in the bureaus of steam engineering and construction.

The original natural divisions of these three bureaus have become unnatural and very complex and illogical. All three operate both steam and electrical machinery, and generally throughout are trying to do similar work that now falls under one profession. I shall not endeavor to relate all the unreasonable subdivisions of the work in these bureaus, but will cite only a few samples; as new methods have been adopted, each bureau has claimed as much of the work as possible, and each head of department, disagreeing, has written out his case, and all the papers

have gone to the Secretary of the Navy for decision. In the meantime, in many instances, the work has waited several months until the matter was settled. The decisions have not followed any rule, but the bureau in most favor at the time has generally won. If the question was referred to a board composed mostly of line officers, the decision was given very frequently to the line officer contestant, if there was the slightest possible justification for it. I would remark here that with a general staff of pure line officers to pass on such questions, the bulk of industrial administration would pass from the staff bureaus into the hands of the military administrators, in case human nature should not unexpectedly reform. To-day the department of Steam Engineering owns the steam pipes of Construction pumps and engines, the deck hatches and gratings and their fastenings leading to the boiler and engine rooms, and also that portion of the hull drainage pipes that drain these compartments; Equipment owns the dynamos, and the dynamo foundations if there are any, and the railing around them if attached to these foundations! Shall I go any further? Suffice it to say that the lines of cognizance between these bureaus are more mixed up than the present navy pay table. The fault is not in the bureau *method,* but in the fact that the bureau *system* has not been readjusted to suit the natural divisions of shipbuilding as they exist since the steel ship has created a revolution in shipbuilding methods. Shipbuilding was originally made up of several professions, but to-day it has merged into a single profession, and it not only includes the production of the whole ship but it operates the shipbuilding plant by which it controls the profit which forms the measure of efficiency in industrial administration. The remedy is the simplest business proposition in this country—consolidation. There is no economy in shifting cognizance from one bureau to another as now organized; each department has developed according to its needs by virtue of experience, and to shift its power, plant, or shop, to some other department only acts to deprive the one that needs it, and prevents the responsible party from controlling its own profits. There is a great deal of talk about consolidating the power plants of a navy-yard! The idea seems to be that only the power plants are duplicated. That is a very great error. Everything is duplicated and multiplied. In the navy-yard with which the writer has been associated for the past five years there are, in the several departments, the following shops, viz.:

6 Power plants,
8 Machine shops,
5 Joiner shops,
5 Paint shops,
5 Laborers' lobbies,
4 Blacksmith shops,
4 Pattern shops,
4 Tinshops,
4 Fuel oil plants,
4 Testing laboratories,
3 Electrical workshops,
3 Copper shops,
3 Riggers' gangs,
3 Polishing shops,
3 Fuel gas plants,
3 Foundries,
2 Steel-plate shops,
2 Electro-plating shops,
32 Storehouses, under separate roofs;
50 Material fields, or piles of materials, not under cover;
13 Coal sheds and bins, under separate roofs.

Some of the foregoing shops exist only in miniature, being parts of other shops, but are separate organizations doing similar work. A more exact idea of the extent of these repetitions may be gathered from the following:

Power plants: Construction and Repair owns two, one main and one auxiliary; Steam Engineering owns one; Yards and Docks owns two, one main and one docking plant (in the same building with the C. & R. plant); and Equipment owns one.

Machine shops: C. & R. has two main and one emergency (and two floating not counted above); S. E. has one main and one emergency; Equipment has one; and Ordnance has one.

Foundries: C. & R., S. E., and Equip. have one each.

Smitheries: C. & R., S. E., Y. & D., and Equip. have one each.

Joiner shops: The five departments have one each.

Pattern shops: The four departments, excluding Ordnance, have one each. Two of these have not separate shops but do their pattern-making in their joiner shops.

Tinshops: The four departments, excluding Ordnance, have one each, some doing tinwork with tinsmith machinery as parts of other shops.

Paint shops: The five departments have one each, two of them employing one, two, or more men sufficient to do their own painting.

Copper shops: C. & R., S. E., and Ord. have one each.

Steel-plate shops: C. & R. and Y. & D. have one each for working plates and shapes.

Electrical workshops: C. & R., Y. & D., and Equip. have one each.

Laborers' lobbies: The five departments each employ their own laborers' gangs and implements.

Fuel-oil plants: C. & R. has two; and S. E. and Y. & D., one each. Two of these are small units.

Gas plants: C. & R. has one, and Equip. and S. & A. (testing laboratory) have a small unit each.

Testing laboratories: C. & R., Y. & D., S. E., and S. & A. have one each.

Polishing shops: C. & R., S. E., and Equip. have one each.

Electro-plating shops: C. & R. and Equip. have one each.

Riggers' gangs: C. & R., S. E., and Equip. each employs its own gang of riggers.

The 32 storehouses comprise buildings and shops containing stores of any kind, whether in the possession of the general storekeeper, or of the department having cognizance of them.

The 50 material piles include every sort of material of value in separate lots, or different varieties, as distributed near the storehouses or shops where it is most likely to be used.

It may be noted that in each case of shop duplication above the construction and repair department has one, that being usually the largest one.

Now add to these the corresponding sets of foremen, clerks, and draftsmen in each department, and you have 75 foremen, 80 clerks, and 36 draftsmen. By foremen is meant master mechanics, quartermen, and leadingmen combined; *i. e.*, men who superintend work. There are 13 foremen machinists, of whom 4 are master machinists. Of the 75 foremen, 40 occupy positions in charge of their respective gangs. Of the 80 clerks, 33 belong to the general storehouse. By clerks I mean all those who would be so termed in civil life.

In one department there is a leadingman patternmaker in charge of 4 men; in another it requires a master patternmaker

and a leadingman for 7 men. In one, there is a quarterman molder for 15 men; in another, a master molder for 18 men, etc.

There is no necessity for more than one shop of each class and kind, as proved by the private shipyard, and no private shipyard could afford to have so many directing officials.

The shops and forces of the departments being duplicated, it follows that the heads of departments, and hence the departments themselves, are pretty nearly duplicated, which is, actually, from a shipbuilder's point of view, a fact. Nothing short of industrial consolidation will be worth while, and the establishment should not only be consolidated but it should be divorced from the military, so to speak; that is to say, the one shipbuilding department should be a unit under the one shipbuilding head, responsible for the economy of the work. Our navy-yards would then be as in France. We are moving toward the French methods. We tried the British Admiralty Board from 1779 to 1781, but abolished it. It was tried again from 1815 to 1842 in the form of the Navy Commissioners, but it was again abolished as being unsuitable. Every young nation tries first the British Admiralty method. It suits England for reasons purely English. The posts of honor and command are kept in the aristocracy for the benefit of the younger sons of the nobility. The line of the British Navy is sought by them as a profession. The "Board of Commissioners for the Execution of the Office of Lord High Admiral of His Britannic Majesty's Navy" belongs to a privileged class. In this country we expect a man to be responsible only for what he knows; our lords of industry are the engineering nobility who have won their titles by actual achievement in their own particular line.

We have left the British Admiralty method far behind long ago, and are approaching the French system. We hear of a general staff—that is what we somewhat erroneously translate the French état-major to mean. We hear that we need a "bureau of personnel" and a "bureau of materiel." That is all French in name and method, and all our own bureaus are adopted and named after the French. Then let us have the French bureau of "materiel" precisely as it exists, which consolidates all industrial shops and work under the one head of "naval constructions." Its head is a "director of naval constructions"; its directing personnel is composed of "Ingenieurs des constructions navales." It includes

also all ordnance workshops and fittings in navy-yards. Unlike our ordnance, theirs is manufactured by civil industry and shipped to navy-yards where it is handled and installed by the department of naval constructions. French navy-yard industry is confined to the one department, which combines every shop and tradesman under a single head; and that not a military head, nor a number of mixed military and industrial heads, but under an industrial head who is competent to take the responsibility for the things he knows, the things of his special education and training, the things of his pride and ambition, the only things by virtue of which eminent ability may permit him to rise to any sort of distinction. Not that he needs distinction and should be allowed to attain it, but that the human composition is such that the best efficiency cannot be attained by any other inducements in a system where hope of reward must be the stimulus; where neither capital, salary, nor interest, from a personal investment, are at stake. 'Individual responsibility reposing in the head who is instructed in the things he is responsible for is at the root of efficiency.' Our bureau method is pre-eminently such a *method*, and is the most perfect yet devised, but has become uneconomical for the plain reason that the *system* of the bureaus has not been readjusted to suit the natural subdivisions of the present times; until the supposedly "sharply defined duties and responsibilities of over-specialized bureaus," to adopt Captain Mahan's diction, have become interlaced, interwoven, and intertangled to such an extent as to exist only in theory and imagination, but have no semblance in reality.

The Bureaus of Construction and Repair, Steam Engineering, Equipment, and Yards and Docks should be combined under the heading of Bureau of Naval Constructions; the Bureaus of Ordnance, Supplies and Accounts, and Medicine and Surgery to remain practically as at present; excepting that, as in France, the Bureau of Naval Constructions should have cognizance of its own materials so as to control the economy in their purchase and handling.

The Bureau of Ordnance should remain as now excepting that its duties should end with the manufacture and shipment of ordnance and armor; its plans should be limited to these items and should not include any portion of the vessel to which they are applied. This is in order to unify the manufacture of plans at

the Navy Department and the plans and building work at shipyards as the nearest approximate measure of economy. Strictly speaking, ordnance and armor belong to the broad division of materiel, along with the rest of the ship, by definition, and by the example of the navy furnishing us with the term; and hence, logically, should be combined with the other bureaus of materiel. In that event, it would become advisable to detail line officers as inspectors since, in this country, unlike some other countries, naval ordnance has been developed and manufactured almost purely by line officers and it would not be advantageous to take it out of their hands. This renders it less advisable to include the Bureau of Ordnance in the consolidation; but since the ordnance and armor factories are not situated so as to duplicate work of any kind, a result almost equal to consolidation will be obtained by consolidating the design and building of ship and machinery, exclusively only of ordnance and armor, under the single industrial bureau. This arrangement need not exclude the inspector of ordnance when guns are being installed on shipboard, but should require his presence, as in France.

There is sufficient evidence to believe that the Bureau of Navigation has grown too large, and that it should be separated into two bureaus, the new one to be called the Bureau of Personnel. This bureau could take over the items suggested by its name, and other kindred duties that will leave only the items concerning strategy to the Bureau of Navigation. The latter bureau would retain, of course, the Intelligence Office, the War College, the direction of the fleet, war plans, and all those functions which go to make up the sum total of "the wielding of the navy as a weapon"; and besides would inherit, from the defunct bureaus, the Naval Observatory, coaling stations, other naval stations, and in fact everything else except navy-yards, stations, and docks, engaged in the building or repair of vessels. I merely suggest, not advise, the latter subdivision. It cannot, in any wise, affect industrial administration.

The present necessity is the unification of navy-yard industry, so that it cannot duplicate itself, and so that naval industrial administration may operate in the full benefit of modern methods as developed with such eminent success in the private industries of this country. All power plants, shops, heads of departments, assistants, draftsmen, clerks, foremen, leadingmen, and me-

chanics may be combined into one set of each class or kind. The result would effect a reduction of the number of buildings in use, the working forces, and the total cost of the establishment, by an amount that would be startling to predict. The military authority should remain supreme in a commandant, but the industrial establishment, being in subjection to the military, need not be subdivided into a number of mixed administrations interwoven as now, but combined, and divorced as a pure industrial unit.

EVILS TO BE CURED.

One of the present evils of greatest moment is the unsystematic method of laying out new yard plants and the distribution of shop buildings among the various departments. The sites for the plants themselves are selected, usually, by people having an eye only to the depth of water, facilities for military protection, and the nature of the soil. The most important economic industrial considerations contained in the contour of the site and water frontage, and in the economic arrangement of shops, have seemingly had no part whatever in the establishment of our navy-yard plants.

Economy in arrangement, whereby labor and material travel by the shortest route between shop and ship, is an asset which means a goodly percentage in profit as long as the plant endures. A steel plate that will travel three hundred yards from plate rack to its place on the ship's side in a poorly arranged plant, may travel only a hundred yards in its course from machine to machine in a well-arranged plant. The reduction in cost of handling is very appreciable; and if this be applied to all the multitude of articles that go to complete a modern ship, the difference in cost is considerable. The same condition obtains with labor, which is more important because more expensive. The shipfitting and joiner shops belong nearest the building slips and fitting-out berths, so that the class of men that fit and refit from shop to ship will have to walk the shortest distance; for the similar reason that the engine and boiler shops would be at the rear, as near the fitting-out berths as possible, since the engines and boilers may be built complete in the shops, and when ready may be hauled any distance by rail to the fitting-out berths. Every shop has a logical location in a shipyard, yet no shop can have its proper place by our methods. Each department seeks

the main business street as centrally located as possible. Sites and shops are let in a haphazard way, and even if determined by a board the most influential member gets the most central location. In the navy-yard of my most intimate acquaintance the distance of the farthest buildings from the power-house of one department is so great that the cost of the electric-power wires is something extraordinary; one department is widely separated into two large halves by another department lying between; and the joiner shop is farthest away from slips and berths while the engine and boiler shops are nearest the slips and docks, just the reverse of where they ought to be. Yet the losses on first cost and circuitousness must appear in the figures of cost as long as the plant exists.

Another great source of loss lies in the lack of harmony that usually exists between the heads of departments. There are two sorts of inter-department administration; one, where controversy is rife, another where obliging tact prevails. It may be observed here, incidentally, that the one who wilfully enters into a squabble is a downright enemy to economy, for when at their best, heads of departments are far enough apart by the very nature of things. One department finishes its work to where another begins, and then endeavors to get the other department to supply the connecting link. The second department may have its men on a more pressing job, or may not even have obtained funds for the work in hand. The delay in connecting may be anywhere from an hour to a month. Worse than that has happened. These misconnections are very frequent, due to the simple fact that the various heads of departments have different trains of thought, and one cannot divine what the other intends to do until the time arrives. The great effort of working ahead of time in all the mass of details is not to be expected from men whose capital or income does not bind them to it, and whose salary depends on the limits of the single duties of their own department as laid down in the navy regulations. Unintentional misconnections between departments are the source of the greatest loss of time and money in the operation of the plants as they now stand. One department owns a crane, a second department is using it, while a third department waits for it. The time of making connections, getting permission, and waiting may keep a whole gang of men out of work for some time. One

department builds a shop, the second department buys an elevator for it; the original plans made to fit are changed by one department without the knowledge of the other, and the elevator is found not to suit the shaft, so the floor just completed must be cut out again.

A load of steel plates arrives and must be immediately removed by one department, from the receiving station. This causes one handling. Another department has the list of plates, what they are, and who they are for, and retains it sometimes a week or two. When the list arrives the third department has to inspect them one by one to examine the inspector's mark on each. The first department doesn't find it convenient to handle them until the broken crane of the fourth department is mended to avoid rehandling them twice again. At the end of some months the inspection is completed, and the contractor has lost several months' interest on his money.

One department buys a lot of materials that it thinks the other department will need, and owing to a miscalculation of the other department's habits, the goods lie in store for an indefinite time. Two departments disagree on a matter touching both. The first one begins the work and the other writes a letter to the commandant, who refers it to the first one for his arguments. If the work is important the commandant authorizes the one he thinks is right, and forwards the papers to the Assistant Secretary of the Navy for a decision to guide in future cases. If unimportant, the work may await the decision. Sometimes friction arises between two departments; they begin to make caustic remarks and endorsements to each other. The clerks, foremen, and workmen soon catch it and there is a regular blockade of the interlying work between the two. When this happens, lords of old in feudal castles were not in more impregnable fortresses than are the two belligerent heads. The warfare is waged silently by mutual understanding; each puts the other out as much as possible, and there is no power on earth to stop them except by mutual consent. The commandant seldom has evidence of its existence. If anything comes up in correspondence he settles the point at issue; if one reports the other verbally or by letter, the other always has a plausible reason to offer. It is simply impossible for one to make the other come to time, and reports are liable to cut both ways, like a two-edged sword, and are out of fashion.

Yet the general staff adherents argue that a commandant needs more power to coerce yard departments into agreement and economy! He now has all power, and no one dare disobey his order. The only right left to a head of department is to appeal to the Secretary of the Navy if he thinks the navy regulations have been violated; but he obeys the order in the meantime without question. If a commandant had the power accredited to the Czar of Russia he would be as completely dependent upon his heads of departments as he is now, unless he felt disposed to go into the details of all the work in the shops, and the accounts, of the various departments. If he had no end of authority the industry of a navy-yard would rock along in about the same old way. The evil is one of organization.

A dry-dock belongs to one department, also its operating power plant. The operation of it belongs to the second department, and if the engines and boilers become old, dilapidated and uneconomical, needing to be replaced or repaired, the first department must obtain the appropriations and make the repairs, if it approves the changes; its uninterested opinion governs, and in the meantime the second department bears on its books the unwilling losses from uneconomical operation, sometimes for a period of years.

The most unnatural scope of bureau cognizance is exemplified in the modern floating dry-dock which falls under the bureau bearing a similar name, due undoubtedly to the circumstance of a name inherited from the graving dock. The design and building of a floating dock belongs purely to naval architecture (and not to civil engineering); yet the government fails to utilize its own naval architects in such work, but pays the premiums going to the naval architects of civil industry.

Another misfit is found in the building of a new shop by one department for another. The second department begins simultaneously to procure appropriations for the machinery. First there is a duplication of drafting work. The building plans originate in the second department, defining the internal arrangement within its cognizance. These plans are remade with changes by the first department. The one department's machinery requisition goes through without a hitch while the other department's building may be held up for months after the machinery is delivered. The building may go a winter or two

without heating or some other necessary facilities, while the other department's force must endure it. The building foundations may have been laid before the necessity of driving piles to support the other department's machinery becomes discovered, and when the piles are then driven the foundations are ruptured and require expensive repairs. On no kind of work is misconnection so rife, so radical, or so damaging as between the department that supplies the building, and the one that supplies the machinery and uses it. The building just completed must be mutilated with holes, underground wiring conduits, brackets, and machinery foundations to suit the needs of No. 2, which No. 1 could not foresee to assemble himself or to have assembled in time to make all connections; and the worst of it is No. 1 lets the contract to a civilian contractor, No. 3. If the middle man, No. 1, built the house himself, there would be some logical excuse for his separate existence; but navy-yard shops and houses are built by private contract, as in other countries.

A contractor delivers a load of coal for department No. 1. A sample is inspected and passed by body No. 2. An order comes from department No. 3 forbidding the schooner to unload until a ship is moved from the vicinity. Department No. 4 owning the crane must be consulted to have the crane hands sent at the proper time. Inter-department correspondence ensues, until finally, after about four days, the schooner comes alongside and is unloaded with the ship, crane, and everything else standing in the same positions as when she first arrived. The loss to the contractor is four days demurrage on the schooner, and he could not get damages from the government if he tried, and the government could not fix the responsibility if it tried.

One department confers with another by letter, and gets a reply in a day or two; mails are sometimes delivered quicker in a city. Letters from business firms come to one department and are referred to the others, one at a time, for endorsement. In four to ten days the circuit is made and the original letter sometimes goes back to the business house plastered with six to ten endorsements in reply to its query. The amount of paper work is out of all proportion. The cost accounts of a manufacturing department are duplicated in the accounting department. The accounts of work done by one department for another are duplicated in both departments. Copies of contracts for one depart-

ment made by the purchasing department are duplicated in both, together with many contingent inspection and other papers. A head of department executes a multiplicity of orders and then becomes a paper defendant to justify his actions brought into question always after the work is done. The amount of paper work inherent in the system leaves only too little time for carrying out the real work.

There is also the commercial representative evil. Some commercial houses have representatives who visit navy-yards as constantly as any of their other customers. They convince foremen, leadingmen, clerks, chemists, officers and their assistants of the quality of their goods, and offer specifications, suggestions, and objections. Any of the latter, in some way or other, at some time or other, may be able to influence the kind or quality of the goods bought. The evils and dangers are apparent. Business houses claim, and they have, a right to discuss business with the government, and to have representations at the rejection of goods. A single department would render practicable the concentration of all business inquiries in a single office and officer.

A board of inspection also complicates the situation. There are three members, two of whom seldom see the goods they sign away, but only delay the paper work, in triplicate. The member representing the department for whom the goods are bought is the *de facto* inspection board and is so known to contractors and government alike; the presence of a board and all its paper machinery does not even conceal the fact, and the one member bears all the responsibility. There are six separate offices in which inspection papers and correspondence are eligible for consideration or endorsement, viz.: general storekeeper, commandant, head of department concerned, inspection board, chemist, and the representative member. The shortest possible single trip is via four of these, the return trip being the same. The time of a single trip depends on the uncertainties of messenger service, but is usually a day to a week, unless by urgent necessity a *simple* paper is escorted throughout the trip by a single messenger, which even then is long unless all hands happen to be in.

There is a shift of head of department and representative member for every department's inspections, which leads us into the problem of permutations and combinations to figure out what may happen to inspection matters that touch all departments, or

more than one, at the same time; as naval supply fund materials, for instance.

The head of department most concerned has the final "say" in practice, and all departments being combined into one would place inspections under his direction and responsibility the same as the rest of his work; that would abridge all papers and place the work and the final "say" where they actually rest now. If there ever was an anomalous paper institution, it exists in an inspection board.

Another superfluity is the paint board, which loses time in the preparation of a lot of useless papers. Combination would replace it by a simple letter from the head of department.

Each department is not complete in itself, but may require another department to do work it cannot perform; one having no foundry may make requisition for the one with foundry to make its castings. The first department must furnish the materials while the other department does the work and transfers back the charges so the labor may be paid from the appropriations of the department having cognizance of the work. Thus the cost appears against the first department, whereas it really had no hand in controlling the amount, which may be exorbitant. This occurs constantly, and it is evident the total expense account of a department includes a portion made outside of its control and for whose excess it cannot be responsible. Another feature is illustrated in the effect of shifting cognizance from one department to another. Once, the government decided to economize by centralizing the lighting plants into a single department. The result was, the department that needed light on ship work was supplied with inadequate lights, the ancient practice of using candles grew to an unnecessary extent, and hundreds of men have stood many hours in the dark, glad at the opportunity for a rest. The authority shifting the lighting from the department that controlled its cost and operation for its own work could not have understood how its details were going to work out. With all power plants shifted and consolidated under one department as the bureaus are now adjusted, the operation and cost of power would be beyond the control of the department using it, but the cost would be charged against that department, which would be held responsible for it, notwithstanding, since this cost must have been included in the estimates, and appears on the

books against it. Such reform as that is truly "straining at a gnat and swallowing a camel."

Another illustration of inter-departmental methods may be shown by the following example: An appropriation is made to build a ship, and is apportioned at Washington between the three bureaus producing the hull, machinery, and equipment. The department building the hull must be responsible for its cost. Incidentally, the building slip and launching ways must be prepared. A fourth department having no allotment must drive the piles by virtue of its cognizance as determined in the navy regulations. The hull department must require the piles to be driven by the fourth department and the latter determines all features included in the cost. The pile-driving department answers to nobody for expense, being the supreme judge of all matters touching its technical duties, while the cost is transferred back to the hull department, who must answer for it, though having no control over it. This requires the hull department to detail an inspector to watch the pile department to determine whether the men charged to the job have actually been present and properly engaged on the work as paid for. No regular inspectors having been provided for such work, this inspection is delegated to some one who is most handy; but only on large work of importance can inspection be employed, for there is so much small work going on of a similar character that it is impossible to anticipate it or to check it up after it is done; for in some cases where such charges have been transferred, it has been found that men so charged for a whole day may have been engaged on the work only an hour, or perhaps a few of them may only have handled some of the material in the shops, or may have done nothing at all on the work. This result may be quite unintentional, and due to the methods of preparing accounts; but I shall not descend into those minutiæ. A day never passes but what every department transfers accounts of work done for the other departments, and they are of such varied and irregular character that practically no one can be held responsible for their correctness, much less for the economy exercised in producing them. The same is true of work within the cognizance of one department which has not the shops to do it with, and must request another department to do it, with the same transferring of accounts and uncertainty of costs.

Is this evidence enough, or shall other instances be cited?

How should it be remedied?

Shall the commandant be vested with authority to violate the navy regulations defining bureau cognizance, or shall he be permitted to violate the appropriation act and charge the work to the most convenient appropriations, to avoid the paper and other evils? If so, will some one venture to explain in what features will navy-yard administration be benefited thereby.

If not that, then how will a general staff, composed of military administrators, line officers only, interposed between the present bureaus and the Secretary of the Navy, ameliorate the situation?

There is no possible solution other than consolidation.

At the moment of this writing, out of a yard force of 1426 workmen, at the yard I have in mind, 761 of them belong to the construction and repair department, and 665 to all the other departments combined. At all navy-yards in full operation the construction and repair department force is usually greater than all the others combined, and always has been. The reason is because navy-yards exist principally for the construction and repair of ships. To consolidate the whole is not far to go.

Consolidation would cure, also, the spasmodic economy evil: one department has no money to do absolutely necessary work, while another department cannot find enough work to expend all its funds; one can obtain all the material it needs, another has to take what it can get; one can supply motors for all its power on shipboard, another cannot afford generators to give the crew electric lights; one can supply mahogany furniture for every need, another cannot replace an article of furniture that falls to pieces from old age; one is worked to the limit of mental and bodily strain to reduce the costs, another rocks along easily, waiting for the quitting bell to ring. One wastes what the other saves.

One of the most expensive luxuries indulged in by the government is a haphazard administrator, a merely accomplished officer, whose only necessity is to know enough to keep out of trouble, and perhaps, after some experience, to accumulate enough data to engage in a controversy! He is putty in the hands of his foremen. A ship arrives, to be overhauled. The foremen make his estimates for him, and in so doing they determine the limits of the estimates. Shall this work be repaired or renewed? The

foreman says it must be made new, with suitable gestures! the foreman's judgment usually governs the totals of the estimates. One who is not in a position to know better than his foremen must retreat when the latter present arguments which he knows not how to refute. Likewise the foremen determine the actual limits of the work undertaken, which may overrun the estimates. Foremen are from among the workmen, who are their friends and companions, and it is but natural to look out for new work and hold fast to that in hand. Otherwise, it means discharges for the tradesmen, which is not a popular idea among them. Usually when an old ship gets safely moored alongside a navy-yard for a general overhauling she may bid farewell to the world until there is other work in sight.

One must know more than his foremen and have the will-power of his convictions in order to be able to limit the work to its proper amount and cost, and he must be very energetic and diplomatic in exemplifying his superiority by a vigorous line of action. When several hundred expensive mechanics are engaged on a single ship, at a cost of several hundred dollars a day, more money can be sunk in shorter time than in any other way at a navy-yard, especially if the workmen are holding on to the job like grim death, with no other work in sight, with a figurehead in charge of the department. If the electric lights go out and the men stand idle for an hour, that is of little consequence where the work of repairs may be drawn out several months without half trying.

Recently the captain of a ship forwarded to Washington a letter accompanied by a sample copy of each of the different bureaus' blank forms for survey, his contention being that all these forms should be reduced to a single one applying to all bureaus alike. The stores belonging to one bureau must be included on a separate form supplied by that bureau, and the bureaus' forms differ on account of the differences of the methods and usages of the bureaus themselves. The consolidation of the bureaus handling material would reduce these forms to unity, and thus ameliorate a number of kindred inconveniences.

Another evil which combination would cure is to be found in the prevention of improvements to shipboard machinery where such improvement would transfer its cognizance to another bureau. Thus, steam auxiliaries have refused, at times, for such

a reason, to give way to motors, long after the auxiliary steam engine stands discredited everywhere else. The limit of bureau cognizance influences and injures the design of a ship in various details, and stands in the way of many improvements.

Likewise, no one may encompass, and be responsible for, the design of a ship as a whole. The *art* of shipbuilding is amply provided for in point of quality of workmanship, for where a poor job of work occurs, the person who did it can always be definitely located; but the *science* of shipbuilding has no connecting link provided to unite the interdependent functions governing the mobility of a ship. The speed, vibrations, coal-consumption, radius of action, economy of power, water consumption, and horsepower of a ship depend upon three separate and interrelated things, viz.: the model, the propeller, and the engines. On the model depend the speed, vibrations, wake coefficient, bow and stern waves, and horsepower. The functions of the propeller influence and depend upon the model, wake coefficient, speed, revolutions, slip, vibrations, depth of water, coal and water consumption, radius of action, indicated horsepower, and economy of operation. On the engines depend the speed, vibrations, horsepower, coal and water consumption, revolutions, radius of action, and economy of operation. The bureau that designs the hull has no "say" with respect to the propeller and engines, and the bureau that designs the latter has no say about the hull; so that no competent person is provided for, or permitted, by the government to design these three component parts, or to adjust them to secure the best results, or to locate the errors in the completed vessel.

If a new ship fails to attain the desired speed, it may be due to the insufficient horsepower or inefficient propeller, of one bureau; or to the lines of hull, foul bottom, displacement, trim, or lack of depth of water at trial, of another bureau's consideration. If there are excessive vibrations it may be due to an unbalanced engine, an improperly designed propeller, or a wrong location of the engines with respect to the hull's nodes of vibration, of one bureau's cognizance; or to nodes of hull, lines of run, or breaks in continuity of flexibility of hull, of the other bureau's cognizance. If the vessel is uneconomical and has a large coal and water consumption, and a small radius of action, it may be due to a foul bottom, wrong propeller, excessive steam consump-

tion of engine, or inefficient boilers. There is no one in a position to locate the fault and denote whether it belong to one bureau or the other; nor is anyone in a position to profit by the experience, and correct future designs. There is greater reason to combine the design of the whole ship under one head than to combine the two departments building it. A ship is too small to separate its design or its building under any but one head. It may have been necessary forty-two years ago when the shipwright knew nothing of steam or electricity, and the separate professions had to be employed to obtain the whole; but at this epoch when a warship has merged into a machinery plant where hull, engines, boilers, dynamos, and all the other fittings are formed into shape by the same or similar machinery, from iron, steel, brass, copper, by the same class of mechanics, there no longer remains an excuse for unnatural subdivisions descended from the olden times. The whole field of the shipbuilding profession to-day is no more than a specialized branch of mechanical engineering—steam engines, boilers, electricity, and naval architecture. Not even so diversified as the mechanical engineering of commerce, which encompasses the broad field covered by the great variety and differences in machinery, plants, and methods employed in the private industries of the country; but merely the comparatively narrow field of mechanical engineering applying to a shipyard plant only, and the architecture of naval vessels and machinery only; merely the same profession now covered by the curriculum of a single school, and encompassed by a single diploma. There is no real barrier to the achievement of modern methods in our tape-ridden navy-yards.

THE GENERAL STOREHOUSE.

The general storehouse was established in navy-yards some seventeen years ago. Prior to its establishment each department had its own storehouse just as it now has its own plant. This concentration of stores under one department was the first move indicative of the vague notion of combine now growing more confirmed in all quarters as the years pass by.

On what pretexts this centralization of stores was made is immaterial. It may have been on the score of economy of handling and storage, but there have also been rumors to the effect that its object was to correct abuses in the improper or un-

authorized use of government goods for private purposes. The latter statement is based entirely on hearsay from the old-time civilian employes of navy-yards, who may have gained erroneous impressions. Anyway it makes no difference since I wish to deal with the actual conditions as they now exist.

The practical effect of this concentration was precisely the same as the shifting of electric lighting, or power plants, or any other shop from one department to another, or from all other departments to the one; since each department still retains cognizance, though not possession, of its own stores. The general storekeeper has not the ordering nor the disposition of the stores, and there is a great barrier of red-tape between each department and its materials by the circumstance of their safe keeping in the hands of a department, independent of any other, which is able to shield any action causing inconvenience or delay by citing a paragraph of the encumbered navy regulations governing the subject. It follows the same rule that is of universal application, that shifting a shop from one department to another, or shifting all similar shops to one department, merely complicates and damages the service; first, by placing a department's work and costs beyond its control; and, second, by causing a duplication of accounts and papers between the two, besides placing all official action subject only to correspondence between the two, through the commandant. The conditions would be similar throughout if each department were located in a different portion of the same neighborhood of a city, and were limited in action to correspondence, each paper going from one department to another always through an office in another separate location; except that city correspondence is more pressing, and city mails are better regulated and are not dependent upon irregular messenger service as is a navy-yard. I am speaking only of the usual routine methods that are in vogue during the long years of peace when the funds are being quietly expended. In war, enthusiasm and patriotism fill the gap and permit expedition and efficiency; but in war special orders abridge the navy regulations and permit purchases even over telephone by any department, and the papers are made out later. In war a department obtains facility of control over its own stores, by special orders, in violation of the regulations, that cannot be obtained in peace.

If a general storehouse now cannot make an inventory of its stock within three years, it is because it has so many duplicated accounts in connection with the materials of the various yard departments and the so-called inspection board that it is irretrievably lost beneath a wilderness of papers, where it must trace its steps through an army of clerks, and record each movement in a library of account books. If all these papers were accidentally burned, an inventory could be made within a few months. There is no short cut from the head office to the stores themselves. The people who handle them must ask the department that uses them, by method of correspondence, survey, inspection, or otherwise, what and how many they are, what they can be used for, what their value is, and what shall be done with them. If there are materials on hand that it will take twenty-five years to use up, it is because the methods of guessing what all the departments will need are so haphazard and uncertain as to bear no evidence, or claim, of a knowledge of the work for which the materials are destined. If an industrial department must employ a large swarm of clerks, it is because a different bureau prescribes the forms and methods by which its accounts shall be kept.

If deliveries of materials lie in the receiving station a week or two it may be because the inspection papers are being prepared in the storehouse; or if the goods have to be moved out of the way, they may require to be handled and weighed twice owing to the subdivisions in these papers appearing on their arrival; or if the materials should happen to be in excess of requirements, it is not discovered until the inspection papers arrive, which requires the acceptance of the excess or a rehandling from storehouse to shipping station at government expense. There is no one who can receive, inspect, and store materials immediately on arrival. The contractor's bill may not have been received, it takes time to prepare the storehouse papers, and when prepared and started on the long journey it requires anywhere from a day to a week for an inspection call to make the routine rounds and connect with the inspector through the office that ironically bears the name of inspection board. But if a chemical test is involved, another set of correspondence begins via the inspection board to the chemist, and with all the departments to be served no one is in a position to set the sequence of chemical

tests as the needs warrant, so that the most needed goods may be, as likely as not, the last inspected. The result is that, from whatever causes of misconnections and delays, the navy regulations are punctiliously observed, while the departments are not satisfactorily served; and many times gangs of men are kept idle for want of materials already delivered but shielded by paper work. It is of frequent occurrence that many important chemical tests have to be waived, and the goods accepted as they are, by the necessity of carrying on the current work.

I will not go through the special class of uncertainties connected with the naval supply fund, but will illustrate by a single example: A department puts in requisition for a certain lot of materials. When it reaches Washington it is approved and transferred for purchase under naval supply fund. When delivered at the navy-yard an inspector of another department gets the inspection call, as likely as not, since nearly all the departments use similar materials throughout, and the department making the inspection welcomes its arrival, and needing it, draws it from store and uses it. The department that ordered it waits a long while, until it grows impatient, then makes inquiry of the storehouse, and finds the materials have been drawn and used long ago by another department.

As to the better safe-keeping of stores in a general storehouse the chances are equal. The general storekeeper must account for all stores on the books, verbatim. The loopholes for missing stores are small in the main storehouse. The safe-keeping feature is only too ideally exemplified. A head of department must sign a daily package of papers in a continuous string transferring materials from the storehouse to the workshops. Each paper bears only materials for a single job order, and the number of papers depends on the number of job orders multiplied by the number of foremen, multiplied by the number of instalments each foreman finds it convenient to make. Nothing can be drawn but what is charged to a job order at its transfer. A foreman can never tell exactly how much he will need. If any materials are left over from the job, as is nearly always the case, they remain charged to the job forever, they are practically expended and are off the books; and I see no reason why they could not be made away with by foremen or workmen who should feel so disposed. And if foremen should desire to undertake such a thing, they

could draw an unlimited quantity of materials in this way, which might disappear, and it would be practically impossible to detect it. The only way would be to establish a system of watchmen, or a miniature storehouse in each department with a special storeman, or be able to discern the excess in cost of the finished articles which, while impossible, would be no proof. The materials cannot be checked up after the paint is spread out on the ship's side, or the steel is worked into a bulkhead. In other words, it depends solely on whether the men are honest, by any system that can be devised, and it seems that the goods would be safer in separate storehouses under five heads of departments, as they once were, than they are as now distributed into the hands and safe-keeping of the forty different foremen in charge. Let that be as it may, the departments as of old would be better served than now. However, I do not wish to deal with ancient, but with modern, methods as in a private shipyard.

The single department as combined should have a single storehouse absolutely under its control, and should have undivided cognizance of the materials therein. Then only such articles as are needed may be ordered, the quantities to depend upon the projected work, and if then there is surplus or excess it may be checked against the total quantities needed as determined from the plans and the finished work. Shipyards order only the materials they may need as determined from their plans and specifications and there is a natural accounting, or check, at the end if any pieces are missing or left over. But in our naval supply fund great quantities of stores are accumulated for everybody in general and nobody in particular. If foremen draw out three times more stores than they need, the general storekeeper doesn't know it, having no notion of their needs; the head of department has such a great mass of papers to sign covering them in such detail he cannot discern it from the transfer papers; and the costs of finished jobs are so involved and erratic that there is no practical method of locating leaks. The system does not totalize, on an expending department's books, the materials drawn, and check them against those that were needed by the plans and specifications. That would be working backwards, at great loss of time and money to no purpose, perhaps; but merely to obtain an accounting which a modern shipyard obtains so easily by the straightforward method of ordering only what will be needed.

Now let us examine what the so-called concentration of stores into a general storehouse has actually effected. It merely shifted the *control* of stores from all departments to the one, but not the stores themselves. It concentrated new general stores, liable to be used by several departments, into two or three storehouses; but particular stores pertaining solely to a single department, such as equipment and ordnance stores, and furniture, certain classes of lumber, etc., etc., have been located in separate buildings forming a part of, or located in the vicinity of, the buildings of the department using them. The result is that the various storehouses and stores are scattered throughout the length and breadth of the navy-yard to the farthest outposts on both ends, and nothing is less concentrated than stores. Of course navy-yards differ from each other in some respects, but I refer to a particular one in mind. In the storehouses are a separate lot of clerks responsible to the general storekeeper only, whose actions, delays, time, and cost are beyond the direction and control of the department having cognizance of the stores; yet the latter cannot touch these stores without first transcending the paper-work barriers intervening, and it must bear the costs incidental to the delays in obtaining stores. In other words, the centralization of stores exists only in theory; and the term becomes ironical whenever there is friction between the employes or heads of the two departments concerned. As it is, the economy and expedition of navy-yard work are *subservient* to storehouse methods and accounts. It is only by means of a combined single yard department, having control of its own stores, that the rational subserviency of the accounts to the actual work could be effected.

There is another feature attached to the cost of handling stores the effect of which is to sidetrack this cost to a separate account, so that it never appears against the materials handled. Thus the total cost figures of a navy-yard-built ship do not include the handling of its materials after delivery until it comes under the authority of the department using it, after the paper work is completed. These cost figures can never be compared with the similar figures of a private shipyard, and there is no criterion by which to analyze or judge them; so they may be excessive or not, and nobody will ever be the wiser. A number of items, such as office expenses, clerical work, etc., etc., do not

appear against a ship being built or repaired; so that, on the whole, the actual total cost is greater than the figures go to show. I do not refer to a ship like the Connecticut, where special regulations are in force, but to the usual navy-yard work.

In other words, the reported cost of navy-yard work has been proved excessive; but the actual cost is greater still, and very much greater when gauged by private shipyard measures, since the latter charge machinery, plant, maintenance, office and clerical expenses, handling materials, and in fact everything to the current work in hand, which navy-yards do not.

On the subject of requisitions for materials, it would take too long to enter into the various details of duplication. Suffice it to say that a number of copies of every requisition must be made by the industrial department, for the storehouse paper-work, the only requirement of such extra labor being merely to facilitate business,—without them the former would have to wait longer for its materials.

Likewise, the operation of assembling a ship's stores would require a separate chapter, of which I will give only a skeleton outline. The ship's stores are defined by the allowance lists, each bureau having a separate one. The industrial department makes up the allowance list, the sizes of tools, etc., having no regard to those which might be in store and would do quite as well if only the contents of the other man's storehouse were known. When the assemblage begins S sends to I its copy of the list. (S signifies storehouse; I signifies industrial department). I then checks the items it will manufacture, and returns it to S via commandant. S then checks off all the other items that are in store, and these articles are set aside for the vessel. Then the remaining articles on the list are set aside for purchase, and a new list of these is made up and sent from S to I via C as before. I then finds that a number of the articles not in store, and ordered to be purchased, consists of heterogeneous small sizes and quantities of goods that no contractor would furnish except at an exorbitant price, and that I can supply from its own stock already drawn from store for current work. I then revises the purchase list, excluding these items, and returns to S via C for correction. S corrects list and returns to I via C; whereupon I prepares requisition and specifications, fifteen copies, and forwards them via C to S, who effects the purchase in a roundabout way which we will not follow up.

Take a concrete example: a modern ship, not two years in commission, was delivered to the government, by her contractors, at a navy-yard. The first correspondence starting the assemblage of her stores was started between the S and I departments 15 months before the vessel was due to be delivered. At her delivery the main bulk of her supplies purchased by requisition had not yet been received, and it was not until 4½ months after she had been delivered and put into commission that she had received her complete outfit of stores. This delay was due entirely to the backward-and-forth paper-work between the two departments, and the chances are that the government could not locate the responsibility in the right place if it tried.

Consolidation would end this useless, inefficient, and very expensive clerical work that requires special talent in at least one of the departments in order to keep the lists from becoming inextricably entangled.

Consolidation of yard storehouse with the single yard department is the only salvation,—though a storehouse should still be retained under the paymaster, having to do only with the usual provisions, clothing, small stores, coal, and all contingent stores of the pay department proper, which pertain distinctly to the needs of ships in commission; such stores are foreign to navy-yard work, and they should not be confused with it.

THE FIFTEEN DAYS' LEAVE EVIL.

One of the gravest of evils is the result of a law giving workmen fifteen days leave per annum with pay. The government's generosity is commendable, and the move is in the right direction. Like the older countries, we are accumulating more holidays, more leisure, and less strenuousness in our habitual over-time rush after the almighty dollar. The quicker we appropriate new holidays the happier and longer-lived we will become as a people. The gift of fifteen days leave with pay to navy-yard workmen is one thing, to which there is no objection; but the method of applying it is laden with the very salt of inefficiency. As a rule the men get their leave whenever they desire it, and may be absent fifteen separate, different, days. In the large yard department employing 760 men, if each man takes leave six different times a year, on an average, the total number of requests for leave will be 4560, or an average of 15 a day; with the chance

of doubling that number. If a head of department should make 15 to 30 investigations a day to see if the men could be spared, at least half the day would be consumed. As a matter of fact they get leave about as often as they ask for it; consequently the daily misconnections, and the filling in of unexpected vacancies, interrupt the continuity of the work; but worst of all, the absences of foremen are more heavily felt, inasmuch as their places cannot be satisfactorily filled. Their work in conjunction with other foremen, and their more important operations, must await their return. With the number of foremen-in-charge going and coming all the year round, the workmen doing the same, it may be perceived that the damage to the government is not in any wise represented by the sum of money appropriated to pay their 15 days leave.

The remedy would be to give one leave per man per annum, of 15 days or less, after each year of his employment, or to close the navy-yard 15 days, or to repeal the law.

This evil is not due to the bureau system, but it is mentioned so as to cover the whole ground.

PRACTICABILITY OF CONSOLIDATION.

Having examined the various conditions in detail we are now prepared to perceive the economic necessities of combination as may be classified under the following sub-heads:

(1) The economical outlay, arrangement, and first cost of the plant.

(2) The economical power operation of the plant.

(3) The economical administration of industrial labor.

(4) The economical purchase and handling of materials.

That is the sum total of navy-yard needs, and there are no obstacles so far as the rearrangement of personnel is concerned. As with shops and workmen, a surplus of superintending officials may be dispensed with. The workmen may be combined with facility, as with clerks and draftsmen, creating a surplus all along the line. Also every shop in the plant may be combined into a single one of each class or kind, excepting storehouses occupying several buildings. There is only one thing in a navy-yard that cannot reasonably be combined, and strange as it may seem, it is the power plants. Nothing more nor less.

In a new navy-yard everything could be laid out in consolidated form, of course, but in navy-yards already established it could be only by the merest accident that the power plants would permit of consolidation. In the navy-yard I have in mind one power plant supplies long-distance lighting, heating, and power. The main generators are alternating current, monophase, high voltage, with transformers; the connecting motors are the induction type. A series generator operates the arc lights. Another department's plant is direct-current, low voltage, connected with many shops full of a great number of new and expensive direct-current motors. A third department has direct-current, of different voltage still, with motors corresponding. It is impracticable to apply the current from one plant to the motors of the others.

In order, then, to consolidate into a single plant a large outfit of new and expensive machinery, including engines, boilers, generators, switchboards, and wiring of the other plants would have to be sacrificed. The total loss in this way, and the first cost of a new supplementary plant, would extend into the hundreds of thousands of dollars. New and expensive machinery cannot be thrown away simply to gratify an ideal notion of arrangement. It would not be permissible to completely centralize the power except by gradual steps as the old plant and motors become worn out. As it is, everything except power plants could be consolidated in a few months and carry on the regular work uninterruptedly; the power plants could best become centralized gradually within the next ten years.

Let us examine into the effect of shifting all power plants to the cognizance and control of a single department as now existing without consolidating the departments. The department supplying power to the other departments must charge the latter for the power they use, so that the manufactured articles will bear the cost of the power required in their production, and so the amount may be paid out of the appropriations authorizing the manufactured articles. That will start a system of transfer accounts between the power department and each of the others, where the using departments must certify to the labor and materials consumed by the power department on the appropriations and job orders of the former.

This would require that each department have separate meters

for measuring the electric light and power used, entailing a duplication of clerical force in each to check the amounts, with the corresponding shifting of paper-work backwards and forth through the commandant. While a general appropriation may be used to cover the cost of heating and lighting buildings, residences, and the navy-yard dependencies, yet it is absolutely essential that the money appropriated to build or repair a ship must include the cost of the power used in its production, which requires the application of the above details of preparing and transferring the accounts.

The above is true of electric power, but when it comes to steam, pneumatic, and hydraulic power, there is no possible way of measuring it after generation. The division of quantities used between departments would be hypothetical, and the cost of the finished work would be uncertain and inaccurate, placing it on a par with the other incongruities inherent in our present multifarious system.

The most important feature in this power consolidation idea has been lost sight of entirely. The cost of the power itself is of little consequence compared to the *labor which the power serves*. In the manufactured article the labor cost is 91 to 97% as against the power cost of 3 to 9% in our navy-yards. In shipyards the ratio of power to labor is 2 to 4% only. The cost of power is insignificant by comparison. Therefore, the system employed should avoid the need of clerical work to prepare and transfer accounts. But by all means, first and foremost, the department employing the great bulk of labor should control absolutely the power and lights for the service of its own workmen, not for the sake of the insignificant power cost itself, but in order to provide and shift it with facility to accommodate the work, so the labor dependent upon it may remain continuously employed; for if men remain idle awaiting blown fuses, or circuit breaks, or accidents, or improvements in another department beyond control, the cost of the work mounts more rapidly than any sort of power cost alone could account for.

Power concentration in any present department is, thus, not only impracticable, but it would only aggravate existing evils!

With all departments combined into one, existing power plants could be reduced to one, two, or three, in number, and centralized gradually in ten to fifteen years; only in new navy-yards

could they be centralized at once under a single roof, and such an installation could be so made that the power cost would not be over 2% of the cost of labor in the entire plant, as in modern industrial establishments.

It is evident that nothing short of a complete plant consolidation under a single yard department will suffice. With such consolidation, a new yard could build an ideal power plant under a single roof consisting of two units side by side. The smaller unit would be for heating and lighting only, to run night and day, operated by separate labor and materials, and charged to a separate account and appropriation: the larger unit to generate the shipyard power, operated separately, so the cost might be prorated among the job-orders of shops using power. Also, the switchboard should be able to throw either electric circuit on either unit to provide against breakdowns, or extraordinary and war-time emergencies. A navy-yard with its hospital, barracks, dispensary, guard-houses, etc., etc., is a combined village and industrial plant, and is different from a shipyard in the item of heating and lighting night and day; and this village cost must not be confused with shipyard accounts.

THE NAVY DEPARTMENT.

Efficient navy-yard industry having been provided for in the foregoing, we are now prepared to consider the Navy Department itself. Whatever is best for navy-yard administration is best for the Navy Department, since the real battleground on which the funds are expended is the navy-yard which determines the economy and efficiency of expenditures. The Navy Department is only a reflection on paper of what navy-yards and shipyards do; it only obtains the lump sums for expenditures, gives general plans and directions, and criticises results effected elsewhere.

The readjustment and consolidation of bureaus is necessary, aside from any features connected with the military administrative needs of the Navy Department which might seem to warrant such a body as a general staff; and while touching upon that subject let us examine the meaning and use of such a body.

In the first place as to the name selected, we of the staff corps prefer that a body of unadulterated line officers should not be termed any kind of staff. It sounds too much like hollow mockery. We do not wish to lose our own identity, however insignifi-

cant it may be; so pray search for any other name among the long list that Admiral Luce gives as being equally satisfactory. Advisory board or strategy board would be a more suitable title. The title of navy board would be more distinctive and appropriate. General staff is too confusing with the army. A staff of officers means essentially a body in which every corps, or profession, or branch of the staff, is represented. A commanding general must have such a staff to avoid giving an impracticable order or one whose details might work out differently from what he would desire. He sees through the eyes of his expert staff, and if one profession is omitted from his staff, one of his eyes is blind; if he has only line officers on his staff, he is one-eyed, so to speak. We need no one-eyed general staff in the Navy Department.

Let us consider the question as to whether a navy board, properly constituted, could not be made beneficial.

THE NAVY BOARD.

The Admiral of the Navy,
Chief of Bureau of Personnel, Rear Admiral;
Chief of Bureau of Navigation, Rear Admiral;
Chief of Bureau of Ordnance, Rear Admiral;
Chief of Bureau of Construction and Repair, Chief Constructor;
Chief of Bureau of Supplies and Accounts, Paymaster-General.

The above gives a composition of the necessary and essential elements required in a working board to consider all matters military and industrial, in peace or war. The surgeon-general and the commandant of the marine corps have been omitted only because their duties are such as to require their presence elsewhere in routine work, and because they are not essential to the board except on rarer occasions when the action touches upon matters concerning their departments. To omit them from the board would be unfair and damaging to the government's interests, since the very fact alone would put them at a great disadvantage in representing their departments. Therefore it is essential that they become members of the board subject to a call by the board only whenever matters under their departments are considered; and also, as a safeguard to secure their rights, they should become members at any time at their own request to consider anything concerning their departments. By this arrangement there

is a majority of line officers to act on the military functions of the fleet, as well as to determine the types of ships and all other matters.

This board consists of a representative of every branch, none of the government's eyes are blind, and the board has at its fingers' ends all the knowledge of the navy, which prevents an action being taken whose effect on any branch was not known or thought of at the time. None others than heads of bureaus are experts in the true sense of the word. The object is not to have some other man just as smart, who can look up the matters that require action. The question is to have the man at hand who is familiar with the detail workings of the present business of his bureau, and has them in his mind immediately available and ready for use; and only a head of bureau knows its inner operations and policies. A different person on the board might run a policy over the bureau counter to that of the chief of bureau, unless human nature should have misgivings; and any system that opens wide the door to the operation of counter-policies out of pure rivalry is in a condition to cause friction, useless paper-work, extra labor on all hands, and altogether, inefficiency.

Captain Mahan says "Military capacity of a very high order may go no further than to say, what is needed in a ship, or a gun, is such and such qualities; but it no less has a right to demand that its opinions on this practical matter should be ascertained and duly heeded." Captain Mahan did not say that the combatant officers should design, manufacture, and wield the fleet and the entire naval establishment. He means that the sportsman shall select his gun, but not necessarily design the instrument, or manufacture it. He means that it requires both an expert tailor and a man of taste to exchange ideas in order to produce a stylish suit of clothes satisfactory to both concerned; and they must get together and talk it over, but not arrange it by correspondence. Like a suit of clothes, a ship is made to order, but a ship is somewhat more intricate, and requires close consultation all the more essentially, which is the object for which a *single* board is created. Futhermore, expert knowledge is needed in the navy board not only in the creation of the fleet, its design and manufacture in peace, but also in its operation in war. As complete a knowledge of the qualities of the ships is needed as of the individuals among the personnel who command them. As complete infor-

mation of the capabilities and limitations of navy-yards is needed as of the supplies of the fleet or any other quality or force on which the strategy and operations of the fleet are dependent. And who would pose as an expert in the purchase and assemblage of supplies for the fleet besides the paymaster-general? The fleet is powerless without supplies, and is crippled without navy-yards. The composition of the navy board, as above outlined, is the essential and logical one, where all interests and professions are represented, and where no order can be issued in ignorance of its effect in all the details of the establishment.

The navy board is supposed to supplant both the general board and the board on construction, and would seem advisable if for no other reason than to permit of harmony, to prevent policy rivalry, and to obtain a single solution, instead of two, for every problem.

As to the idea of reverting to the British Admiralty method by the adoption of an executive board, or general staff, that notion is as antiquated as the British themselves believe it to be.

Bearing on this subject, I will quote from a recent editorial appearing in *Engineering* (London) which not only gives an analysis of the inner workings of the British Admiralty, but replies to Captain Mahan's magazine article in such a way as to indicate that Captain Mahan may be taken to mean other things that the *italicised* version the general staff adherents would seem to make it appear.

"There is no one to whom we are more indebted for our revived interest in the Navy than the distinguished American officer, Captain A. T. Mahan, U. S. N. In his writings he has achieved the rare success of being at once informing and entertaining. He has a genius for his subject, and there is no more distinctive mark of genius than the power to interest and instruct at the same time. His latest contribution is an article on 'The Principles of Naval Administration,' which appears in the current issue of the *National Review*. In it the procedure followed in this country and the United States are contrasted, and, like a good citizen would wish to do, Captain Mahan is able to indicate his preference for the procedure of his native land. For our own part we fail to see that there is any considerable difference between the methods of Whitehall and Washington, though our own procedure is so chaotic that it is quite impossible to say what is and what is not the rule.

"Captain Mahan lays down the very sensible principle that 'efficiency of result will be better secured by individual responsibility than by collective responsibility.' The expression may be taken as axiomatic; but for its practical application it is necessary that individuals should be responsible

for the thing they know, and that their responsibility should be accompanied by reward for well-doing, or punishment for shortcomings. In America, the Secretary of the Navy is unquestionably 'responsible.' When in 1798 a high-handed act of oppression on the part of the French Revolutionary Government brought home to the young American Republic the need for a navy—a need the nation had up to then endeavoured to ignore—the office of the Secretary of the Navy was established by law, and the Secretary was the Naval Administration. He was 'not only responsible, but had to give personal attention to various and trivial details of most diverse character.' Naturally such a burden could not be borne by one man, as the war of 1812 very distinctly proved. There was therefore constituted a Board of Navy Commissioners, but the members were placed explicitly under the superintendence of the Secretary, to act as his agent; indeed, to quote Captain Mahan, 'subordination could scarcely be more distinctly affirmed.' Later the board system disappeared, giving place to that of bureaus, mutually independent; but the paramount authority of the Secretary in his office remained, and still remains, unimpaired; he having 'sole control,' and his being the 'single responsibility' as representative of the President.

"Our own Naval Administration closely follows this procedure in effect, at any rate, so far as the unrestricted control of the paramount chief is concerned. It is true that in place of bureaus, with chiefs independent of each other, we have a collective board; but the First Lord can act independently of the other members, and, so long as he is supported by the Cabinet, is practically untrammelled in his control. Our system is, however, inferior, in that it is, to a degree, amorphous. 'There is no real separation of the duties of the Lords of the Admiralty; they are not the heads of departments rigidly defined; the operations they superintend are closely inter-related.' This 'happy constitution of the Board'—to quote the same authority, a naval officer of experience—'enables it to handle a mass of business now grown to vast complexity, without splitting it up into over-specialised departments, presided over by independent chiefs, with duties and offices sharply defined.'

"Nothing could be more admirably devised, supposing the object to be to submerge all responsibility. As an amicable arrangement among a family party, in which all are tolerant of the failings of others, it is perfect; but that is not exactly what the country wants, nor is it conducive to naval efficiency. The American bureau system, in which the shortcomings in any one section may be brought home to the chief, is far preferable, as, we think, every one experienced in business relations will allow. As Captain Mahan says, 'the American plan fixes the very strictest individual responsibility in the Secretary and in his principal subordinates, the chiefs of bureaus. His duties are universal and supreme; theirs are sharply defined and mutually independent.'

"So far, as between the English and the American systems, Captain Mahan has common-sense on his side; but when we come to consider the matter in detail, it is difficult to see how we can fix responsibility on the head of the chief person nominally responsible, be he First Lord or Secre-

tary. In both cases the appointment is of uncertain duration, depending on political exigencies, and the incumbent of either office generally comes into power without training or previous experience. It is useless to make anyone responsible for things of which he has no knowledge. If a man insists on his cook driving his carriage, or his coachman cooking his dinner, he has only himself to blame if he has to go hungry, or finds himself in a ditch. It would be the height of injustice to blame either of his misemployed servants. So it is with a nation and its First Lord of the Admiralty, or Secretary of the Navy, as the case may be. Supposing we were, unhappily, to find ourselves involved in a big naval war, and our commanders proved to be unskilful, or our ships were proved to be of inferior design and construction to those of our enemy, would any sane man want to hang Lord Selborne or even Lord Goschen? If the appointment to the management of the Navy were a permanent one, we might, perhaps, say: 'You ought to have exercised a wiser discretion in the selection of your subordinates;' but even that would be a little unfair, considering the man had never been trained to the technicalities of the business.

"It is this bringing home of responsibility to the back that should bear it which is at the root of efficiency. Happily, afloat it is not difficult, but in administration it is a most complex problem; but until it is solved the nation must spend millions in vain, and then not be as prepared as it should be against attack. Captain Mahan tells us there are 'two great oppositions inherent in naval administration—civil versus military.' As matters are at present arranged we are in agreement with this, but our answers would be that this conflict of authority—necessarily a weakness—is the result of, and naturally inherent to, chaotic administration. To evolve order it is necessary to make an orderly division of administrative functions, and when this has been done, responsibility may be fixed by giving to different officials the various duties they are competent, by training and instruction, to undertake. There are two broad divisions—not to be confused in naval administration—namely, the production of the fleet and the use of the fleet."

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"It is needless to say that such an orderly system would necessitate great changes in existing methods. At present we have at the head of the constructive and engineering departments at Whitehall a naval officer—the Controller of the Navy. He is the superior of the Director of Naval Construction and the Engineer-in-Chief, not only in regard to design, but in the carrying out of work. Again, the dockyards are governed by a naval officer—the Admiral-Superintendent—who naturally is quite uninstructed in carrying out the work which he is supposed to control, and for which he is responsible. In both cases—that of the Controller and of the Admiral-Superintendent—the appointment is for a limited period, a circumstance which makes any supervision they may be supposed to exercise over manufacturing operations, and for which they are nominally responsible, of a more shadowy nature."

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"Any proposal to divorce actual production from military control may be looked on by some as so unprecedented as not to be safely entertained; but as a matter of fact it would only be going back to the earliest method of naval administration, such as was in vogue when the Royal Navy was first formed. Captain Mahan himself tells us that historically the institution and development of naval administration has been essentially a civil process. In the reign of King John there was a single official, the clerk of the ships; and he alone stood charged with all the duties connected with the maintenance of the King's ships. In those days ships were ships; there were no broad distinction, such as has grown up since, with ever-increasing emphasis, between a merchant vessel and a fighting ship. That made naval administration a comparatively simple problem. In the reign of Henry VIII the division between fighting and mercantile vessels had become so defined, owing chiefly to the advance in artillery, that it was thought advisable to establish a board of five officers, among whom were distributed the various administrative duties; but these officers were all civil functionaries. Later on, under the Stuarts, the Navy Board was formed, the work being done under the superintendence of the Sovereign, directly or through a minister. The head of the Navy, as a military force, was the Lord High Admiral; but, we are told, in early days that officer was not necessarily expert in naval material.

"The Duke of York, afterwards James II—who, as has been recently said, was a good seaman, if a bad King—became Lord High Admiral, and took control of the Navy Board. Here, it would seem, was the origin of the system, which has lasted to the present day, in virtue of which the military branch absorbs all control, both in the direction and the management of the Fleet; for when the Duke of York was deprived of his position, an Admiralty Board, military in character, succeeded to the authority that he had established.

"There were, however, for some time after two boards, one of the Admiralty and the other of the Navy, one military and the other civil, and though the former was the superior, the Civil Board succeeded in maintaining a position which has been characteristic as of more than semi-independence.

"The subsequent supremacy of the military element, such as we see in the present day, was not at first such an anomaly as it is now. Ship-building then was a compartively simple matter. Science had not taken the place it now occupies in the production of war material, and in regard to the propelling machinery—masts and sails—the naval officer was the chief expert. A board of naval officers might therefore be entrusted not only with the designing of ships, but in a large measure with the details of their construction. How different are the conditions in the present day need not be insisted upon at length. But established procedure dies hard in this precedent-ridden country, especially when patronage falls into the hands of a privileged class, and it may be long before we find the business of ship-construction reverting to a class who understand the operations they profess to direct. There is, however, room for distant hope."

The foregoing scheme of a navy board has been presented merely to show the logical composition of such a body, competent to do the work now done by the two boards it should supplant; but there is no evidence that such a body is needed in an executive capacity. As we have seen, it could not alter the political administration; it could not ameliorate the problems of industrial administration; hence it could only influence the military administration in the wielding of the navy as a weapon.

What evidence is there that the Navy Department has suddenly grown weak at its strong point, the only point in which its ability and fame have never been brought into question by any sort of failure or disaster. We have no substantial evidence that anything has ever been lacking in the war administration of the Navy Department. There was some evidence of needed reform in the war administration of the army. The navy has always had unmodified success in war, thanks to the unsurpassed ability and gallantry of our fighting officers, and nothing succeeds like success! With a long unbroken line of successes on our list no one can discredit the strategy on shore, or the strategy and tactics afloat, of our naval administration.

What sort of a body is a board, and what is it fit for. The name may be applied to all deliberative bodies. The senate, the house, or one of their committees, may be termed a board. The jury of a court of justice is a board, just the same as is a board of directors in a business establishment. Naval boards fall under the same heading. A board is a deliberative body whose functions are (1) to investigate an act already committed, (2) to assign a penalty, or (3) to lay down a rule governing future action. It is not in any sense of the word an executive body nor is it fit to become so. Should a grave question of state arise, no one can imagine that the president should consult congress or its committees before action. He has the law and precedent before him. He is the executive and must act; and then, afterwards, he must stand personally responsible to congress for the action committed. His cabinet opens to him the facilities of the law and precedent, and we imagine that a majority vote is not taken to govern his action in a matter that concerns any government department; but each cabinet member must be an executive head, and therefore expert, and in a position to supply any information needed. Formal cabinet meetings seem to be neces-

sary for facility in the transaction of business, but it would seem that, if the offices of cabinet members were located under the roof of the White House where the president could deal directly with them, the meetings would be quickly reduced to the informalities existing between the executives at the Navy Department.

A board is slow and cumbersome, and is not fit to transact current business. Its speed, like a fleet, is that of its slowest member; and an absentee, or an opinionated or obstreperous member, is liable to throw the whole mechanism out of order.

Every question has to be argued out in detail for the enlightenment of everybody. An executive weighs carefully all the considerations of a case and comes to an unbiased conclusion; but if he is only a member of a board, having reached his conclusions he must present the case to the others, and is thus liable to become a strenuous verbal and paper advocate, pleading his views to such an extent as to create a suspicion of bias, thereby losing his point, and incidentally a lot of valuable time. But a board already biased by its necessary composition of line and staff officers, is liable to cause a division of votes out of personal considerations, foreign to the laws requiring efficiency in administration, and develop into party politics, so to speak. As a general rule the action of a board in purely technical matters is more or less accidental, and might be different if undertaken on another day when the members are in a different mood; but the ordinary navy board for the transaction of routine service investigation is a necessary safeguard, inasmuch as members are selected indiscriminately by rank, without regard to their qualifications to consider the particular case under investigation, in the hope of including enough talent to do the work required.

These are the reasons why an executive board, of any composition, would be an unnecessary encumbrance in the Navy Department. But if the secretary should see fit to create an advisory navy board, he could constitute it by a simple order. The best logic in the creation of the general board appears to have been in the purpose of supplying our then newly created admiral with an office and duties commensurate with his distinguished services. That object might be attained even better by appointing him president of the navy board as above outlined.

The only legislation needed is the following.

1. An act abolishing the Bureaus of Yards and Docks, Steam

Engineering, and Equipment; and creating the Bureau of Personnel in the Navy Department.

2. An act creating the office of Assistant Chief of Bureau in each of the bureaus.

With an Assistant Chief of Bureau—already long needed, there being one already in fact if not in name—the bureau chiefs would have more time to devote to the operations of the navy board. This board would be merely advisory and dependent, as the present boards in the Navy Department are.

Let it be well understood, however, that a navy board is not in any way essential to the industrial efficiency of the Navy Department. I merely suggest, not advise, its creation. It may be valuable, to avoid friction and duplication of work inside the Navy Department, and to provide an advisory board covering the whole field of military and industrial operations, which neither of the two boards it replaces fully cover; but it cannot in any wise influence industrial administration, excepting in so far as it may facilitate the preparation of the general plans and specifications of vessels. Even then it can influence only the time, but not materially the cost, of providing new ships.

The consolidation of bureaus would slightly change the aspect of the Navy Department as indicated in the following:

The consolidation of bureaus would slightly change the aspect of the Navy Department as indicated in the following:

Secretary of the Navy.

|

Assistant Secretary of the Navy.

|

Bureaus.

Bureau Personnel	Bureau Navigation	Bureau Ordnance	Bureau Construction and Repair	Bureau Supplies and Accounts	Bureau Medicine and Surgery	Judge Advocate General's Office	Marine Corps
Personnel Training schools and adjuncts	War plans Strategy Intelligence office War college Naval stations Wireless telegraph, etc., etc. All items of defunct bureaus except navy yards	Same as now excluding ship design work and shops at navy yards	Design, building and repair of ships and all their contents, except armor and ordnance Navy yards, buildings and grounds Floating and other docks Its own storehouse	Same as now, except the C. and R. stores	Same as now	Same as now	Same

The Navy Board—supplanting { The General Board and The Board on Construction.

It is supposed that the rest of the department will remain unchanged.

A navy-yard after consolidation would look something like this:

Commandant.

|

Captain of the Yard
(Chief of Staff).

|

Commandant's Staff
(Consisting of line and other officers, for court-martial and other duties).

Department of Construction and Repair	Storekeeper	Yard Paymaster	Dispensary	Marine Barracks	Observatory	Naval Hospital	Receiving Ships
Shops, buildings, grounds, docks, navy yard industry Its own stores	Provisions, clothing, small stores, coal, S. and A. stores	Same as now	Same	Same	Same as now, but under Bureau of Navigation	Same as now	Same

Civil engineers may be attached to naval stations belonging to the Bureau of Navigation, or to the staffs of commandants, or to navy-yards on duty for the Bureau of Construction and Repair, as their services may be required. Line officers performing engineering duty only, may be utilized at inspection duty on shore in an independent capacity, in keeping with their rank and eminent abilities. It is immaterial whether they serve a different bureau.

Line officers in general, during their periods of shore duty, may be assigned to inspection and other duties under the technical bureaus.

At private shipyards, line officers may be assigned as inspectors where needed, having separate specified duties.

When the necessary legislation shall have been passed, the Secretary of the Navy will have the authority to distribute the work among the bureaus, by which the above arrangements may be realized. When that is done, navy-yards will be able to build and repair vessels as cheaply and as efficiently as private shipyards, steadily year after year. Then, the industrial administrator may hope for the same measure of success in the future as has ever attended the efforts of the military administrator in the past.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

DESERTION FROM THE NAVY.

SOME FACTS RELATING TO IT, A DISCUSSION OF CAUSES, AND SOME REMEDIAL MEASURES PROPOSED.

By LIEUT.-COMMANDER JOHN HOOD, U. S. Navy.

Much attention has recently been called to desertions from the navy by many of the papers of the country; and the impression conveyed to the public has been that these have reached an alarming number. Most of these notices have been written in ignorance of the conditions existing; and, while the aggregate number of desertions for the past year has been numerically large, the percentage, while much greater than it should be, is not unduly great, considering the conditions, and is in no way alarming. Affairs, however, could be vastly improved, and it is in this belief, and to do what little good there may be in my power in that direction that this paper is written.

It would be well if the very able paper written by Capt. A. S. Williams, U. S. M. C., on much the same subject, that appeared in the NAVAL INSTITUTE for December could be more widely read. Captain Williams writes on the general subject of desertions from all three of the military services, army, navy, and marine corps, and nearly all the points could be little improved on.

My own remarks will be confined to the naval side of the question, and principally to what I believe to be removable causes, and their remedies, a subject that I believe myself competent to write on from a fairly long experience, a close observation, and much thought and study.

There will be found on page 35 of the Report of the Chief of the Bureau of Navigation for 1904 the following information:

	Petty Officers.	Men.	Apprentices.	Total.
"Desertions,	528	3439	521	4488"

"The percentage of desertions is 1/10 of one per cent in excess of last year, or 15.6 per cent."

This was from an enlisted force of about 30,000, the maximum during the year being—in April—30,753, and the total number in service June 30 being 29,321.

It will be seen that the great body of desertions—3439 out of the total of 4488—came from the "men," which includes seaman, ordinary seaman, landsmen, firemen 1st and 2d class, coal-passers, messmen, etc., or practically *all* the enlisted force of the service of first enlistment with the exception of the apprentices. For the purposes of discussion, it is a pity that the report did not give more detailed information as to the proportion of desertions occurring in these various classes. From my own observation and information, I should say that in proportion to numbers the coal-passers furnish the largest percentage of desertions, followed by landsmen and firemen 2d class; and if the bureau would sift out the desertions by classes, I believe that much the larger portion of the total of 15.6 per cent would be found to come from these classes.*

This is natural, and in no way surprising, since these classes include what may be called the raw material from which the body of the navy is gradually forged, unskilled men, mostly without trade or calling, entering for the first time on a life totally new and unnatural to them.

Taking into consideration the changed conditions of life that these men encounter on their first entry in the service, the ease with which desertions may be accomplished, and the little they have to fear in the way of adequate punishment should they be apprehended and brought to trial, it is only wonderful that the percentage of desertions is no larger, rather than that it should be so large.

Human nature averages much the same, and no body of 30,000 men can be found in which there are not many weak and some vicious characters. While I believe our enlisted force will average higher in intelligence and self-respect than that of any other navy in the world, it yet contains its full quota of both the weak and the vicious, which cannot be avoided by any system of re-

* The statistics referred to by the author will be found in the appended table, which was compiled by the Bureau of Navigation and given out officially. P. R. A.

cruiting, and for the elimination of which no adequate means are provided in our naval laws and regulations. To such men the contract entered into with the Government and the oath taken on enlistment have no meaning.

To the vicious perjury is natural, and the weak do not *think*, and are led by the vicious.

It is from these two classes, almost without exception, that deserters are made,—aided by other influences that will be discussed later,—and it is my firm belief that it is possible by a proper system to eliminate the larger element of vicious characters from the navy, and thereby save and train the weak and unthinking ones, and reduce desertions to a minimum.

I believe if the seagoing officers of the navy were consulted generally, an almost unanimous opinion would be found that in a large majority of the cases of desertion occurring, if it were not for the military crime committed and the bad example set, the desertion of the men concerned would be for the navy's good. It would be found—always leaving out the question of the maintenance of discipline and the prevention of military crime—the exception rather than the rule when regret was felt over the loss of the deserter himself; and, when such is the case, a close investigation would usually disclose some good cause; for few men worth retaining after their first year of service think of desertion.

Our system of recruiting through the country at large is, I believe, excellent, and produces good results. At no time in the history of the navy has the standard of self-respect, honor and good conduct been higher in the enlisted force as a whole than at the present, and this in spite of the abnormal expansion of recent years. Yet, notwithstanding this, and however careful the recruiting officer may be,—even with the commissioned personnel, after the careful training and weeding-out process at the Naval Academy, we sometimes find men holding commissions the navy would better be without,—there is rarely a ship's company formed in which there are not some men of vicious character, whose idea of their duty to the Government is to be fed and clothed and draw their pay; who have no feeling of degradation at punishment, do only such work as they are driven to, and obey only such laws as fear of punishment compels; and, finally who remain or desert as their personal gratification of the moment directs.

Another characteristic of this class of man is that he rarely deserts for good and all; but after a period, when he has become good and hungry again, delivers himself up as a "straggler," or enlists over at some other place under a different name; and goes through another cycle of similar operations, until he may be finally come up with and dishonorably discharged.

While the majority of a ship's company disapprove of a man of this character as strongly as his officers, and are glad when he is finally brought to book and gotten rid of, yet, from some clannish feeling among enlisted men, they rarely assist in exposing him; and his influence over the weaker members of a crew is usually great, and the example of lawlessness he sets has caused the fall and desertion of many men who might otherwise have been trained into efficient men. If such men are eliminated early in their career, one fruitful cause of desertion will be removed; for the effect of tolerated lawless example on weak characters cannot be overestimated; and I believe it may be safely stated that one such character adequately punished and dishonorably discharged in the early stage of a cruise will save at least half a dozen desertions; while on the other hand, a misplaced leniency which revokes such a sentence, and retains the one bad character, will probably produce as many.

Moreover, this influence of the vicious character on the weak acts at a time when the latter is peculiarly susceptible to such influences, during the beginning of the recruit's naval career, and before he has learned to appreciate the advantages of his new life. Though all recruits enter the navy of their own free will, few appreciate the gravity of the contract they make or the solemnity of the oath they take, and most think little or nothing of such things until time and training have taught them to do so.

They leave their native surroundings with little or no idea of what lies before them, to take up what is truly an honorable career, with great rewards before those who are capable and striving, but at the same time the most unnatural of all lives—that of the sea. Little wonder that the thoughtless are adrift for a time, and that the weak are susceptible to bad influence and example until they have found their bearings in their new calling. It is during this formative period that most of the desertions occur, or in which are strengthened the vitiated tendencies that lead to desertion in later years.

That such early desertions and vitiated tendencies are encouraged by the retention in the service of known vicious characters is beyond question, and that the riddance of the service of those characters is difficult under the present laws and regulations under all circumstances, and almost impossible on foreign stations, until the damage has been largely accomplished, is equally beyond question; and it is proposed in discussing remedies later to formulate a plan by which one vicious man may be lost to the service that half a dozen or more better men may be retained.

The two other most fruitful causes of desertion in the navy—to either of which it is difficult to give precedence, they are both so potent—are, one, what might be called the "homelessness" of the men due to constant shifting of both officers and men from ship to ship, and, the other, what might be characterized as the extremely variegated discipline obtaining in the navy.

Without giving either of these the preference as a factor for evil, but taking them in the order they have been mentioned above, I will discuss first the evil effect on the men, and its inducement to frequent desertions, of the constant changes of officers and crews that has, more or less necessarily, obtained during the past few years.

Some attempt has been made by the department and the various commanders-in-chief to remedy this evil,—which is not only a direct inducement to the men to lose interest in the service and desert, but is also a powerful agent working against ship and fleet efficiency,—but only with very partial and meager success. To accomplish results, the reform must be radical; and even though the beginning might mean a considerable temporary reduction in the nominal strength of the present commissioned fleet, the end to be gained would far more than justify it. Until officers and men serve together for a commission, and learn to know, understand and trust each other, and take a pride in their own ship, which is their home for the time being, there can be no thorough ship and fleet efficiency; and just as long as officers and men are bandied back and forth from ship to ship, serving some months on this ship, other months on that, and so on through three weary years, men finding new and unknown officers with each transfer, new and unknown shipmates of their own class, just so long will the men be without any "home" feeling, with few or no service ties; and, like all other tramps,

wanderers, and houseless men, be inclined to cut it all and leave when the conditions on their temporary boarding-house—their ship for the time being—do not satisfy them.

The enlisted men of the navy are very human.

There has been more done for them than for the men of any other navy in the world, they are better paid, better fed, better cared for, given more privilege than any other men; and, those who compete and strive for it, and are worthy, have the highest reward, even to becoming admiral of the navy, within their grasp. But pay, food, privilege, and even high prospective reward do not make up all of life. They have also the instincts and human inclinations for forming natural ties and friendships like other men; and when these instincts and inclinations are thwarted by constant change, "home" feeling and interest are deadened, a spirit of changefulness and restlessness—too common already in the American character—engendered, and they are soon trained to look upon the ship they are in for the time being as only a temporary abiding place; and should it not be as satisfactory as the last, there is growl and discontent. One step beyond this, with the "move on" spirit that has been fostered in them, if the next change does not come soon enough, is to desert. The passing out of a man under such circumstances as a deserter, when he becomes dissatisfied, is easy; and almost natural, if his moral nature has not been fully developed. He may be with men he does not know at all, have few, if any, ties of friendship or association to hold him, and with a defective sense of duty—and many men in the navy whose services are valuable are afflicted that way—he has no ballast to hold him except self-interest, which a few drinks of bad liquor and a sense of grievance, fancied or real, will destroy; and the man goes.

Were the same man trained up on one ship alone, with the knowledge that the ship was to be his home for the commission, the men he lived with were to be his housemates for that time, unless he were more than merely thoughtless and careless, he would form ties of friendship and association, and gradually take on the feeling of the best element of the crew,—of which there is no lack in our men,—ties and feelings which would be a powerful deterrent not only to desertion, but to wrongdoing as well.

The body of the enlisted men of the navy are honest and honorable, and disapprove of desertion as strongly as their officers. Give this sentiment a chance to operate by keeping ship's companies intact, and many a foolish man whose only fault is weakness of character who deserts now, will be strengthened and saved to the service by the moral support and restraining influence of his shipmates and friends.

Taking up now that other fruitful cause of desertions which I have characterized as the "variegated" discipline obtaining in the navy, we come to a question more difficult to deal with, depending as it does, primarily, on the varying individualities of all the commanding officers of the service, and, secondarily, on that of the junior officers.

Were the misleading statement of the Declaration of Independence that "all men are born free and *equal*," only true, the matter could be easily handled, and a uniform and just system of discipline, with equal punishments, rewards, and privileges established on all ships of the navy.

That such is unhappily not the case is only too well known; and anyone who has been at sea during the past three years in the position of commanding or executive officer, with the many enlistment records from many ships passing constantly under his eyes has had only too much proof of the fact.

The examination of any number of these records, many of them bearing the names of many ships, and the signatures of even more commanding officers, will show not only the shifting service of the men, but the erratic changes of systems of discipline they have been under. The records of punishment for the same offense, committed under the same circumstances, will in nearly all cases be as varied as the ships; and the records will show that such offenses as ship-jumping, drunkenness on duty, and smuggling liquor, have been considered anywhere from mere trivial offenses to the very serious breaches of discipline they really are, and variously punished accordingly.

Then again records from some ships will appear filled with truly mere trivial offenses and punishments, while those from others will be clear.

On the privilege side of the question the records do not speak so clearly, it being possible to draw from them only negative evidence on that point, which evidence will usually be borne out

by observation of the men both on their ships and while on shore; and proper lawful privilege, freedom and trust will usually be found where the clear records prevail, and, something else where the others.

The handling of men is the most difficult, delicate, and the highest duty an officer is called on to perform; and the views thereon are almost as varied as the number of officers, in some particulars. But on the main and essential points in carrying out this difficult duty all officers of recognized ability will agree: discountenance and suppress all "nagging," have a uniform and unvarying scale of punishments carried out without fail or favor; treat the men as *men* and *not* irresponsible children; require the utmost of men on duty, but grant and encourage any lawful privilege off duty and all the personal freedom consistent with a military system; give liberty with regularity at all healthy ports at all times when all the men are not required for duty; trust the men until they prove untrustworthy, and, if any fail, punish the individuals and not the ship's company; see that the commissary does his full duty by the general mess.

Those are a few simple rules to which I believe all good officers will subscribe; and were they properly carried out, desertion from the mismanagement, rather than the management, of men would almost wholly cease.

That desertions will totally cease, even with the most perfect system of discipline, administered by perfect officers on all ships, is an Utopian dream that will never be accomplished.

So long as human nature and men are what they are, there will be found some in the 30,000 or more who constitute the enlisted force of the navy who are mentally constructed to find grievances where none exist, and weak minded enough to let their fancies overbalance their sense of right, and who will desert.

But desertions from this cause, which are numerous now, might be very materially diminished and reduced to a minimum, by the institution of a more even, uniform and just system of discipline throughout the navy.

The preceding has been an endeavor to set forth as clearly and briefly as possible some of the principal facts relating to desertion in the navy, which, while in the aggregate large, I do not consider as abnormal under the conditions existing, together with some of the main causes which much thought and obser-

vation on the part of the writer has led him to believe produces them.

These causes may be briefly summed up as:

1. The average weakness of human nature, there being in any large body of men its due proportion of weak and unstable characters.

2. The presence—unavoidable at the start—of a small percentage of vicious characters in any large body of men, however carefully selected, whose example and teaching influence strongly the weak.

3. The blunting of all the natural instincts of human nature, and the homeless and friendless "stray dog feeling" produced in men by frequent shifting and changing.

4. The want of a uniform, just, and strict, and at the same time liberal, system of discipline.

5. And last—comment on which is considered superfluous—the undue use of intoxicants by men of weak mind.

Of these, the first and the last,—like the poor—we will have always with us, and their amelioration is a question for the consideration of the physiologists, physicians, and theologians; and the practical reformer must take them as he finds them, and do the best he can with the material on hand. Hence they will be no further discussed. But with the second, third, and fourth the remedy is largely within the hands of the naval authorities; and while they can never be totally eliminated, conditions may be so bettered that desertions will be confined to a class that the navy had much better do without.

Taking them as they stand in the list, the remedy for No. 2 consists in the elimination of the vicious characters as soon as they develop, early in their career; and in the intimate life on board ship their development is rapid. This does not mean the thoughtless and untrained, but only those of the new recruits who show criminal tendencies, or utter lawlessness or worthlessness, and old offenders whose records have been already made.

To accomplish this the machinery for summary bad conduct discharge should be much simplified from its present cumberous state. In the case of men in their first year of enlistment, in any home port, the unfavorable report of a board of three officers investigating an alleged vicious character, approved by the

captain, should be sufficient and *final* to discharge the man summarily. On a foreign station, an equally summary proceeding should be sufficient to remove the man at once from his ship to the nearest point for shipping home. Few of the undesirables would escape this process, and it would be possible to remove them before their influence on their weaker brothers had been established, instead of being compelled, as now, to keep them on their ships often for weeks on the home station, and for months on foreign stations, during which time their influence for bad is at its greatest, while the present unwieldy summary court proceedings are going through their slow process of reference to Washington and back again, with a likelihood of reversal of sentence at the end.

This recommendation of such summary discharges may appear harsh on its face; but, I believe it would do much for the betterment of the enlisted force as a whole, and would save many desertions; and I also believe that such power as is proposed may be safely trusted in the hands of those who are most interested and who know best the circumstances. Some few cases of injustice may be done by incompetent officers, but hardly more than by the present system of courts.

After a year of enlistment, and a man's record has been made to a great extent, any sporadic outbreak on the part of a man should be treated with more formality, and he be given regular formal trial as now.

Under the same head of elimination of bad characters, there are frequently encountered in the service cases that have always appeared to me to be peculiarly vicious and demoralizing, and to approach nearly to direct encouragement to desertion. I refer in this to the cases of men who have clearly deserted once, and have later either given themselves up or been apprehended, and have been taken up and sent into the general service again, sometimes with and sometimes without trial; and also to the cases of men tried and convicted of crime, and afterwards pardoned and sent back into service. There may be, and undoubtedly are, cases of men deserving of clemency for past misdeeds: but it has been my observation that it is a rare case when such men are not elements of disturbance in a ship's company and centers of bad influence; and it is difficult to see how new and untried men can be trained to a proper sense of the dishonor of

desertion or other crimes when they see it thus lightly treated by the authorities, and the supposedly dishonorable man living with them on the same terms, and treated with the same consideration as themselves.

I believe in our enlisted men; and I believe, as I said before, that the great body of them are honest and honorable and self-respecting; and I do *not* believe that such men should have men with a brand upon them thrust amongst them, to live shoulder to shoulder with them; nor will a right idea of the seriousness and disgrace of desertion ever be general among the men as long as the authorities continue this baneful practice.

For these reasons, I believe, and would advocate, that no man convicted of a crime, or once sentenced to dishonorable discharge, or who has once deserted or attempted to desert, should ever be sent again into general service. If he is deemd worthy of clemency, his sentence may be diminished, or the "dishonorable"—which deprives him of citizenship—may be stricken from his final discharge; but, it seems to me, the naval service is too honorable a service to harbor men with such a blot on their character, and my own past experience with them seems to prove that it is a rare case when their after life redeems it.

Taking up cause No. 3 of the list in the causes given above, the remedy to that lies entirely in the hands of the department.

It will undoubtedly, at the beginning, cause some dislocation of the force in commission at the present time, to inaugurate a proper system of commissions; but, if we are not only to check desertions, but more important than all—keep the fleet in its highest fighting condition, the change will have to be made sooner or later; and we may well follow the admirable lead set by the recent reorganization of the English fleet, and the sooner it is done the better.

Though an essay might be written on this subject from the point of view of the fighting efficiency of the fleet, I will not touch further on this view of the matter in this paper, which is intended as a discussion of desertions, its causes and remedies, but confine my remarks to the effects of the proper commissioning of ships on checking desertions.

There is an old but true saying that, "the best ships are the happy ships"; and the fundamentals that go to make a "happy ship" are, discipline strict but just, a mutual knowledge and re-

spect between officers and men; and the ties of friendship between man and man who live together in close comradeship, giving each man a sense of the support and dependence he can place on his fellow. These conditions can only obtain when officers and men live together a long enough time to know each other and to "find" themselves. This can be accomplished in a wonderfully short time if the officers and men *know* they are to be bound together for a full commission. With the best intentions, it is rarely if ever done completely and thoroughly when either officers or men are birds of passage.

The result in the men is the feeling of homelessness and unrest spoken of above, with the severance of all the ties that bind except the one of self-interest.

The simple remedy for this is to put the officers and crew on a ship for commission, and allow no changes in either except to fill vacancies caused by death or other total disability. To do this would require a definitely worked-out scheme of rotation of the ships for commission, and the laying up of some now in commission, for the inauguration of the plan, and a regular and continuous plan of recruiting. But once started, it would work smoothly and easily.

With our system of four-year enlistments, and three-year commissions, it is more difficult to carry out the scheme than it need be, and both enlistments and commissions might be well changed with advantage. I have, myself, long believed in the two-year commission, recently adopted by the English, and I would advocate a five-year enlistment to go with it so that each man would make two full commission cruises during his enlistment.

By this plan the next ship on the schedule to be commissioned or recommissioned would have her crew made up half of men on their second cruise, and half of new men just enlisted, this crew to serve together without change for the two years. At the end of this time the old men would be paid off, the new ones just finishing their first cruise be given a short leave, and then to report at the various rendezvous as directed, to form the nucleus of the crew for the next ships in turn to be commissioned, the full crew to be filled out with a new draft, and so on.

Not writing this paper as a scheme of organization, only the merest outlines of the plan suggested above are given, to show

that the plan is feasible for providing fixed crews for a two-year commission, with an interval of leave and home duty for the men between cruises, and with the nucleus of each crew made up of trained men.

With crews so fixed, and once fixed as unchangeable as the laws of the Medes and Persians, I believe all that is best in the men would be brought out; and the example and acts of the portion of the crew making their second cruise would be a powerful deterrent against the tendencies of the weaker members of the new drafts making their first against desertion.

Coming lastly to No. 4 of the causes for desertions given above, the remedy is not so clear, and I fear can be only partial, since it is impossible to provide all ships with commanders of equal ability and insight. Much might be done, however, to lessen the evil by the department and the various commanders-in-chief and squadron commanders.

While the power of a commanding officer in administering the internal affairs of his ship in the way of punishments are fixed by the statute law, and may not be curtailed by any other authority, he may be held to strict accountability for the misuse or disuse of those powers by his superior officer; and this would appear to be too rarely done.

The general character of offenses on all ships are the same, and are well known and can be easily tabulated; and, generally speaking, punishments for them should be uniform throughout the service, or at least in particular fleets and squadrons. This, unfortunately, is not the case, as has been stated above; and privilege varies almost as much as punishment. The result is on some ships contentment and few punishments and desertions, and on others constant punishment and frequent desertions, combined the first with good and the last with poor discipline; and all depending on the character and ability of the commanding officers.

So long as men differ in capacity—which will be until the end of time—this trouble cannot be wholly eradicated; but it could be much ameliorated by commanders-in-chief and commanders of squadrons holding a closer supervision over the vessels of their commands in which troubles are known to exist and from which desertions are frequent, and calling the commanders of such ships to account. For in all cases there will be found either a misuse or disuse of power.

Ship's companies average up very much the same; and if only left together long enough to become acquainted, will be very much what their commanding officer makes of them. Therefore, give us crews and officers for a commission; then if things go wrong, and desertions are unduly frequent in any one place,—the department, the commanders-in-chief, and squadron commanders having done their part—the responsibility is easily fixed. Let the department authorize and execute the needed reforms, then hold the commanders-in-chief solely responsible for their fleets, the commanders-in-chief the squadron commanders, and these last their captains. If any fail, off with his official head, and to the retired list with him, after the manner of the great Admiral St. Vincent. We will find undue desertion and many other ills reduced to small proportions.

STATEMENT SHOWING PERCENTAGE OF DESERTIONS OF RATINGS IN BRANCHES.

1904.

Branch.	Rating.	Average number in service during year.	Number of deserters from service during year.	Percentage of desertions.
Seaman	Petty officers	3,334	66	1.98
	Seamen	2,409	155	6.43
	Ordinary seamen	3,411	315	9.23
	Apprentice seamen	6,597	672	10.18
		15,751	1,208	7.67*
Artificer	Petty officers and shipwrights	1,627	88	5.40*
Artificer (engine room force)	Petty officers	2,755	130	4.72
	Firemen, 1st class	1,274	102	8.08
	Firemen, 2d class	1,577	301	19.08
	Coal passers	2,567	865	33.67
		8,173	1,398	17.10*
Special	Petty officers	1,348	34	2.52
	Men	762	82	10.76
		2,110	116	5.50*
Commissary	Petty officers	103	1	1.00
	Men	738	47	6.36
		841	48	5.71*
Messmen		1,564	362	23.15*

RECAPITULATION.

Branch.	Average number in service during year.	Number of deserters from service during year.	Percentage of desertions.
Seaman	15,751	1,208	7.67
Artificer	1,627	88	5.40
Artificer (engine room force)	8,173	1,398	17.10
Special	2,110	116	5.50
Commissary	841	48	5.71
Messmen	1,564	362	23.15
Total	30,066	3,220	10.7

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THE SUBMARINE AS AN ENEMY.

By LIEUTENANT A. B. HOFF, U. S. Navy.

In taking up a subject so fraught with the uncertainty of inexperience, both in peace and war, the natural misgivings of the writer urge him to beg for leniency to the following pages, both as to fact and fancy. The article has but one purpose and that is to create, if possible, discussion on both sides of this question of submarines. By thus bringing out new ideas and new speculations, on this somewhat undiscussed subject, our knowledge of the matter in hand is bound to be increased. In advance of extended experiment or actual warfare, this is the only method at our disposal. By so doing we may work out for ourselves new methods and improved means against this most insidious of all foes.

In its rôle of harbor-keeping vessel, the submarine has merely increased the impossibility of such a blockade as that of Admiral Sampson's at Santiago. However, now that we have wireless, a picket gives us any information that may be necessary as to an escaping enemy, and dispositions may be made to cut him off—perhaps as well as ever.

It is not the purpose of this article to reiterate that sea-power rests with sea-keeping ships. This truth has remained eternal, from the days of Themistocles to Togo. As long as submarines are harbor-keeping ships, they are auxiliaries.

If they should ever rise to the size of sea-keeping vessels, they must, perforce, lose largely in invisibility, and develop other qualities. Thus we have a new problem which we are yet hardly in a position to speculate upon.

The writer's knowledge of submarines is purely second-hand. Hence, any incorrect statements, regarding either them or their abilities, is made in the honesty of ignorance and the hope of correction. It is his sincere wish that, in the groping for more

light, these statements may be torn to pieces by those who know, and that others may come to the rescue on his side, so that in the end, perhaps, there may be evolved a few fairly well indicated conditions, in this mode of warfare, that bring with them a consequent line of action on the part of him who has the submarine as an enemy.

QUALITIES OF SUBMARINES.

At the start it is well to bear in mind the chief qualities and characteristics of the craft in question. That is to say, such as they are, at their best, at the present day. These may be cited as follows:

1. Slow speed.
2. Great weight for internal capacity.
3. Inability to see or judge distances well, except in smooth water.
4. Sluggish in all movements—diving, turning, or answering engines.
5. Inability to allow for current, when running submerged.
6. Visibility of tower or periscope by day.
7. Vulnerability to gun-fire.

The one and only quality it has in its favor is *invisibility*. Its whole reason for being depends on this alone.

To make plainer the writer's views, let us touch briefly on these "handicaps," in the order named.

Slow Speed.—About 8 knots. This is always bound to be present in vessels of this type.

Great Weight, Etc.—This reduces their radius of action, by reducing their habitability, internal space for fuel and supplies, etc. To operate 50 miles from a base seems to be the present outside limit, especially under war conditions. Twenty-four hours' war-habitability is about all these craft are now capable of.

Inability to See Well.—There is a difference of opinion, even among submarine officers themselves, on this point. Some claim to see everything, and others very little. The periscope certainly gets easily befogged, but there are ways of clearing it. With tower up, it is scarcely conceivable that a slow, sluggish sub can see to any successful purpose, in any kind of a chop or swell. Anyone who has looked out of a berth-deck air-port, with water washing across its face, can certainly form some idea of how little can be seen from the water-level, in a submarine's conning-

tower. How much more would the difficulty be increased in picking up a darkened ship at night.

Sluggish.—It is obvious what effect this quality would have upon a sub's ability to point her tube quickly at a given target, with the accuracy necessary for a successful shot with torpedoes or air-gun.

Steering Under Water.—By spinning an air-impulse gyroscope in any plane—say north—the submarine becomes independent of the compass. This is, as far as laying a course is concerned. But it does not take into consideration current, in a long run.

Visibility by Day.—A periscope or tower can be seen a fair distance by day. Five thousand yards away it would be plainly seen.

Vulnerability to Fire.—Experiments were, I understand, carried on in Manila Bay with a wooden dummy, which demonstrated this point. This was in a condition just submerged. It may be that high-explosive shell, bursting near a submarine with periscope up, would be sufficient to open her seams. This, however, is in the future.

With all these handicaps, it is seen that, after all, the only weapon of a sub is "invisibility."

How may she use it?

How shall we combat it?

These are the questions we should try to answer.

This essayist is of the opinion that "pickets," "keeping away," and "keeping dark" are among the best methods of overcoming the use of submarines by an enemy. The following is some attempt to show this.

SUBMARINES IN THE OFFENSE.

In common with other harbor-keeping ships, the natural rôle of submarines is the defense. There are, however, some—both lay and professional—who claim for the sub a position in the sea-fleet: their methods of operation seem to be the following:

1. When action is imminent, the subs are floated out of specially constructed vessels, or floated overboard from specially fitted transports, and take part in the action.

2. A fleet investing another fleet, and having a secondary base at hand, transports its subs thither, and operates from there.

One idea of those favoring this second method is, that the submarines will enter the harbor and destroy the shipping inside.

These two cases seem to comprise the whole of the offensive rôles of the submarine. Let us glance at them consecutively.

In the first case, supposing that all mechanical features were overcome and that such launching, or hoisting out, were feasible, I think that we have but to go over the whole history of the rise and fall of portable torpedo boats, to class this phase of their use as impracticable. The submarines are slower and heavier than their predecessors. They must be hoisted out sealed up, and remain so, with their crews inside, etc., until they are hoisted in again—that is if they are ever found.

Supposing the approach of the enemy to be known by wireless, they must go overboard at least ten miles away in order to be ready in time. Their slow speed, however, prevents them from following the fight. They would be quite as likely to destroy friend as foe, if the fight came their way, owing to their poor seeing qualities. They could not fight in this fashion at night, and in daytime, even supposing they *did* get somewhere near the fight, they would have to expose themselves so much to *see*, that they would be a remarkably good target for gunfire. As Admiral Sir Cyprian Bridge says: "Submarines are nothing but handicapped torpedo boats."

The second method of using submarines in the offense is entirely feasible, if the base is near enough. That is, it is practicable as far as being able to operate the boats successfully is concerned.

However, attainment of the object sought is not so well indicated. It is scarcely conceivable that any enemy could not and would not secure its harbor mouth against the entrance of submarine boats. Even with a deep-water entrance, such as Newport possesses, if the submarine should elude scouts and work its way up the harbor unseen, lines of small electro-contact mines, and nets, strung across the mouth, and the entrance blocked up with cribs of stone to 40 feet ought to keep out any submarine. They could not see to lay countermines at night, totally submerged, and if they rose to place a countermine accurately, they would be undoubtedly seen and entangled or sunk by the pickets guarding the mine fields. Moreover, a mine exploded near them would probably start them leaking and sinking.

Another imaginable rôle for a submarine in the offense, is that of a picket, *at night*, for an investing fleet. They might get one of an escaping fleet, if they came their way, but their slow speed

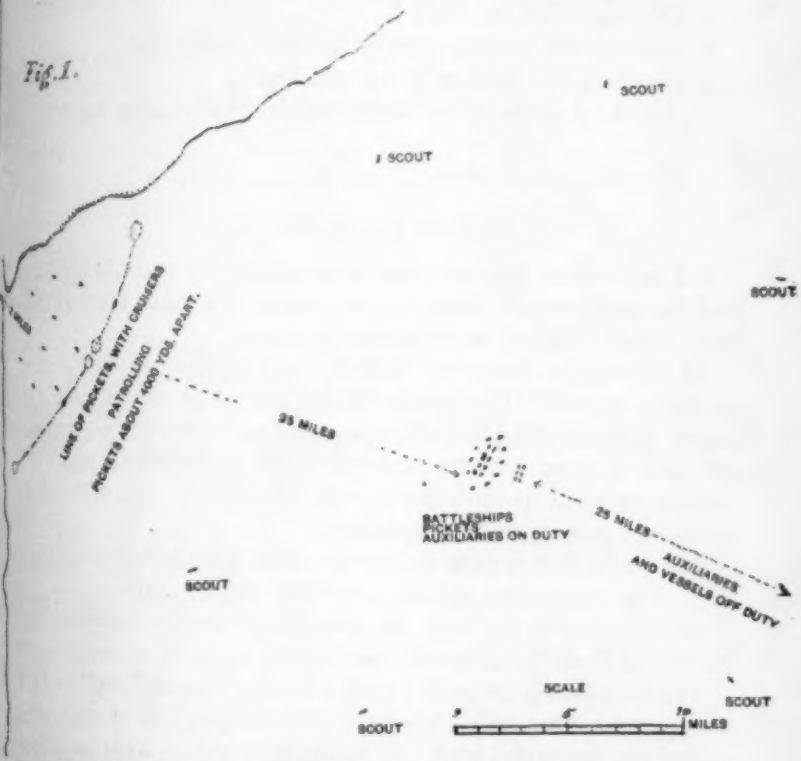
would allow the enemy to quickly get out of their range and radius of action. This is supposing that there was some way of their signaling to the main fleet.

We have here then the rôle of a submarine in the offense.

Is it worth anything?

SUBMARINES IN THE DEFENSE.

In their natural rôle they are a powerful menace, especially if they are in large numbers. In any naval investment they must



be reckoned with, and reckoned with safely. No chances should be taken, especially with the battleships, in the vicinity of submarines, for the command of the sea must not be risked for the take of remaining near a harbor entrance.

It is an interesting speculation this,—of what tactics a fleet or units of a fleet, would employ against the attack of submarines.

Let us imagine a concrete case (Fig. 1). We have a harbor well defended by guns, etc. The coast line is at about 120°.

The enemy's fleet is in port, having been driven off the seas. The harbor is well supplied with subs. Let us suppose the disposition of the investing fleet is as shown. There are pickets inshore with supporting cruisers (against destroyer attack). The battle-fleet with auxiliaries is well out to sea, say 25 miles.

In this case of our investing fleet opposed by a large number of subs, let us note the points we would wish to take up in order, perhaps, to arrive at some conclusions, in the subject under discussion.

1. Disposition of the fleet.
2. Pickets, and counter attacks by them upon subs.
3. Handling the fleet on being attacked.
4. Attack of submarines, singly and in numbers, by night and day.
5. Proposed maneuvers.

1. DISPOSITION OF THE FLEET.

Let us assume that the fleet is composed of eight battleships and the numbers and types corresponding to a main body of this size. Their disposition is shown in Fig. 1.

At twenty-five miles the fleet is in a position to handle any escaping vessels. The auxiliaries are placed as convenience and safety dictate. This last, of course, supposes there is no secondary base at hand. In this unlikely event, it would be well nigh impossible to keep up a continuous investment. However, that is not the subject under discussion.

The battle-fleet is picketed by the destroyers in reserve for the day. The destroyers off duty are with the auxiliaries.

The destroyers on duty are patrolling near the entrance, between the fleet and shore for any visible signs of submarines.

The supporting cruisers patrol a beat, changing their position frequently so that no under-water run can locate them sufficiently well for a successful shot. If submarines should make an attack upon them under the disconcerting circumstances of a coincident destroyer attack, the cruisers make off at an 18-knot gait, get well clear of the subs, and dispose of the destroyers that have followed them, at leisure. This is just one example of the speed-handicap of a submarine.

During daylight the pickets can see any subs awash or their periscopes. If, however, they eluded the pickets and patrols by

deep under-water runs of 25 miles (3 hours), they would have to rise to get some sort of bearings of the battle-fleet, moving in a direction unknown to them, and would then be seen by the pickets. The mere fact of being seen would then spoil their attack. All

Fig. 2.

the large ships would at once make off, leaving the subs, that had already made a long run, to the nets and gunfire of the destroyers. They would have a fair chance of bagging some of them, surely. Especially before they got back to harbor.

Thus, then, it may be said that a submarine attack upon a well-picketed fleet, lying at a distance from their base, has practically no chance by day.

At night, however, it is a different story. A night attack has great chances of success, if the submarines can only get near their target. To do this they must have speed and seeing power.

Then, under the most favorable circumstances, they may probably get in as many hits as a destroyer would, similarly placed.

To combat this likelihood of night attack, the fleet moves to a safe distance—say fifty miles. This is two and a half hours at ten knots from their day position (Fig. 2). The fleet cruises outside this radius all night. This is on the understanding that there is no secondary base. If there is such a base the fleet simply secures itself there from submarine attack.

This radius of fifty miles is taken on the assumption of the present best conditions of the submarine, *i. e.*, speed eight knots, and forty miles submerged run.

A submarine might reach this radius in one of two ways; She may run out five hours submerged in daylight, wait for dark, and do the rest of her running awash (in which case her tower-wave is very visible); or, she can wait for dark, run submerged past the pickets, then awash until near the fifty-mile radius, when she can submerge with periscope only showing, and then be ready for business. Observe that it is said "reach the fifty-mile radius." This does not mean picking up the fleet. That is a more difficult job. In fact, as will be shown later, the chances are much against her picking up the fleet, even if one of a large fleet of submarines. Attacking, at night, on this radius, will always mean returning awash, with liability to capture by patrols and pickets, with no means of offense.

Operating at this distance is, at best, a precarious thing for subs, with their helplessness in cases of accident, and their other handicaps. But there is no reason the distance cannot be increased to seventy miles. At this distance there appears to be greater safety from submarines than from ordinary accidents.

The action of pickets, during darkness, would seem to be to move up nearer the entrance, out of search-light range, ready to fire upon or entangle any submarine they might chance upon. This is not altogether so improbable, if we remember that subs moving with tower or periscope up make a visible wave, if going at any speed.

Moreover, one good shot is more than likely to sink them. Unless the water allows them to run deep, it is well within the law of chances that one or more may blunder into the nets of a pair of pickets. However, at night the indications are that they are not very liable to capture. We will proceed on this assumption.

If the battle-fleet pickets are sent in just before daylight to patrol the sea between the harbor and the fleet, it is quite possible that they may pick up some subs, that, having failed to pick up the fleet during the night, are returning, perforce, on the surface or awash.

The sum and substance, then, of the presented scheme for immunity from submarine attack, is to keep well picketed and outside their radius of action.

2. PICKETS.

Pickets are the eyes and tentacles of the fleet. Nowhere are they of greater value than in the presence of submarines.

The mere knowledge that submarines are in the immediate vicinity is almost safety in itself.

That there must be enough of these pickets, and that they must be of a proper type, is self-evident. As far as type goes, the destroyer seems to fulfill the necessary conditions (as far as we know at present). They are fast and draw somewhat less than ten feet. Hence they are safe for the usual set depth of torpedoes and mines. It is scarcely probable that a discovered (and hence disarmed) submarine would waste a shot on a picket. Destroyers are quick and hard to hit. A smaller type would not be sea-keeping.

However, thought, experience, and maneuvers, should determine the type, and also the number.

In determining the number, in any building scheme, of the pickets per battleship, it should only be done with a large factor of safety for breakdowns, strain on personnel, losses, etc. No more than one day's duty on the inner line every third day ought to be required, with the next day at the depot ship, for sleep, stores, and tinkering machinery. For every fleet of eight battleships, then, three flotillas, of ten each, seem none too few.

Not only for this work of pickets are they good, but they have their own rôle. Also, at sea they are excellent scouts.

Of course they should be fitted with wireless.

The total "sea-army" of an eight-battleship fleet is a considerable number of ships, and as "sea-pickets" (not scouts) they are no more than sufficient for such a large number of vessels.

Pickets are as necessary for a "sea-army" as a "land-army." Posted 4000 yards outside the main body, they could see, in daylight, everything at least two miles outside of them. Two miles is fifteen minutes for a sub. Between them and the main body the eye could pick up easily any suspicious swash, tower or periscope.

At night, in the hope of perhaps seeing the "bone" of a sub moving quickly, they could be better stationed at 1000 yards.

This then is their rôle simply as lookouts.

Now then, in discovering the proximity of subs, what offensive action would the pickets take, both by night and by day. Their action by day would undoubtedly be to move closer and shoot. The English have attacked successfully by pairs of subs dragging a net between them, and entangling them, or pulling their periscope over. Gunfire ought to be effective, however, if any part of them is exposed for as much as a minute. And this is probable, for the subs must get some kind of bearings of their target, if they wish to hit.

As regards the ability of pickets to keep submarines from coming out of a harbor, one method of speculation is as follows: The pickets run strings of small electro-contact mines across the channel mouth. These are picked up in the morning if they have not been countermined during the night. Or, as this would be difficult under the guns of the forts, they might be simply left there. They could be small, cheap, and light. Just sufficient to stave in a submarine.

3. HANDLING OF THE FLEET IN A SUBMARINE ATTACK.

On the pickets discovering the submarines, what would be the handling of the fleet?

The direction of the danger being immediately known, one method of action is to turn the vessel's stern towards the subs, and steam rapidly away. The stern presents a small (although vital) target, and this method has the advantage of quickly getting out of range, and of giving the screw race for the torpedo to run through.

If the fleet went off only at the modest speed of ten knots, a thirty-knot torpedo (extreme range 3000 yards) discharged at 2000 yards would be at the end of its run when it reached the fleeing target. This assumes that the time to turn to run, and the time to take bearings for the shot are about equal. More than this, the screw race probably would throw it off its course.

In addition to the tactics of the fleet, firing would be going on from the secondary batteries of the fleet and pickets.

For the subs to get in a shot they would have to get a bearing. To get a bearing, something must show above water, and this something would be a target for the gunfire of everything at hand.

This is by day. We may then formulate a rule that, on discovering a submarine, a large vessel should turn tail and open fire.

For night, too, this holds good. In this case, however, it might be wise to keep one course for only fifteen minutes. A thousand yards will then have been gained on the subs (speeds eight and ten knots) and the fleet will have moved 2.5 miles away. This change of course might clear a line of submarines lying in wait, expecting the fleet to be driven towards it.

In any event it is essential to avoid panic, and move together on prearranged, and well-understood signals, leaving active measures against the subs to the pickets.

In addition to the above there is nothing so essential as to keep dark. This will be dilated upon later. There is nothing so valuable to a sub as a guiding light of any description.

4. ATTACKS OF SUBMARINES—SINGLY AND IN NUMBERS—BY DAY AND NIGHT.

It is now time to speculate on the other side of the question, trying to imagine how we may be attacked and then how we may prevent it. Let us see how a submarine may be handled for the attack.

First, let us remember her infirmities—slow speed, sluggish, poor seeing qualities, etc. Rough weather increases the difficulty of seeing. Judging distances by periscope is difficult. As before stated, at any good speed the periscope or tower makes a big white "bone" easily seen, even at night, for some distance. All these must be allowed for or overcome in any mode of attack. It must be remembered that invisibility by day can only be obtained by complete submersion, and with this, in long runs,

current cannot be allowed for. The sub must rise, under these circumstances, before delivering a blow.

Take the concrete case of a single sub attacking a single ship. She sees smoke on the horizon, or the faint outlines of a ship. Laying a course she dives and approaches for a distance which she calculates will bring her near her mark (Fig. 3).

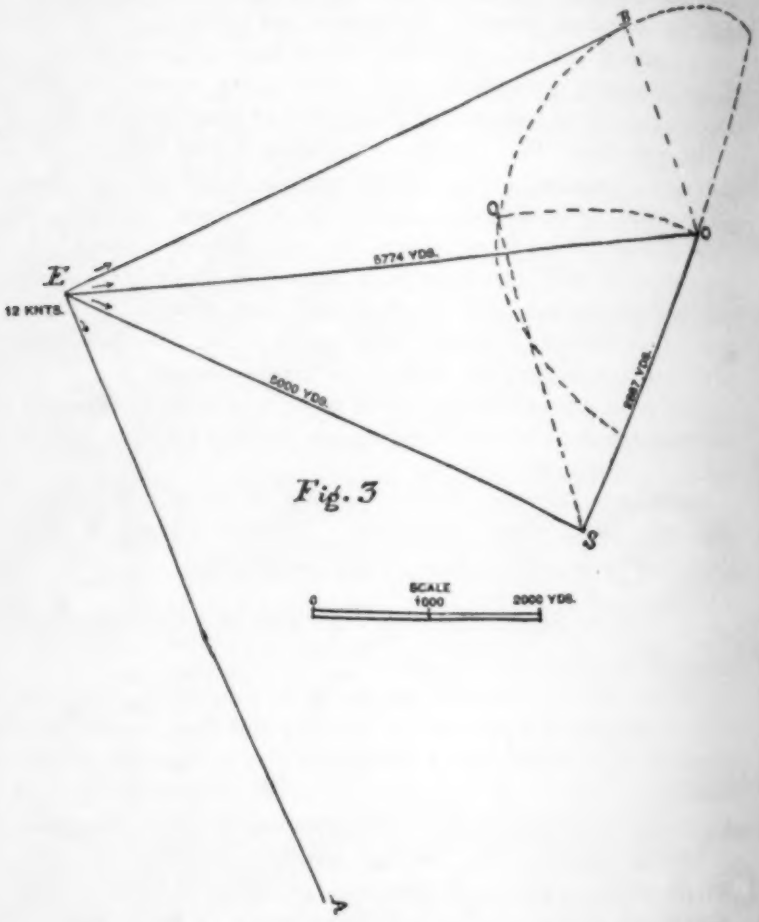


Fig. 3

To do this she must calculate the speed of the vessel and her course. At such a distance, and so close to the water, this calculation is more in the nature of a wild guess than anything else. Say the first distance is 5000 yards. She never could get this

near in reality without being seen, but this makes the following calculation all in the sub's favor.

The speed of *E* (enemy) is twelve knots. Speed of *S* (sub) is eight knots. *S* must lay a course so as to get within torpedo range (2000 yards). Owing to *S's* slow speed the case is impossible unless *E* is steering a course somewhere in the angle *AEB*.

Suppose, however, she *is* steering inside this angle—say *EO*. This is a mean course. The sub dives (not having been seen) and calculates to rise near her and hit her unawares. Suppose *S* makes a miscalculatin of one knot in *E's* speed and of one point in her course. What error would this make on the position of *S* on rising?

An accurate calculation by *S* would put them both at *O* at the same time. Fig. 4 shows this error graphically. *E* is here going

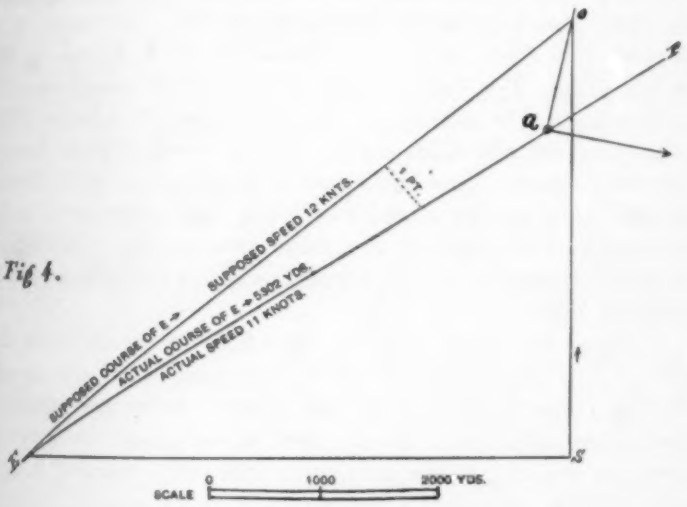


Fig 4.

eleven instead twelve knots. She will arrive then at *Q*. The sub will at this moment rise at *O*, distant about 760 yards from *Q*, and in plain sight. This error will more likely be 1000 yards, as a sub could not approach as close as 5000 yards by day.

The sub now having risen, *E* can turn tail (as per rule), or she can go off at right angles, where more of her guns will bear, and where it will be more difficult for *S* to hit. This last does not seem to possess so many advantages as the former.

So much for a single attack on a vessel or group of vessels. It emphasizes the fact that, once seen outside 2000 yards (and

mostly inside, too) a slow sluggish submarine has no chance of success against any other class of vessel possessing a faster speed—say one-half more.

This is a day attack on a moving enemy. At night the attack is with conning-tower out. The attack is slow, to avoid the "bone." Supposing the subs, or fleet of subs, has blundered into the picketed battle fleet. They dive to get inside the 1000-yard picket line, and then, *if they can see their target*, and *if their target is not moving too fast*, the chances are a successful torpedo shot.

But there are so many "if's." In the first place how far can a sub see a darkened ship at night? If she blundered into a fleet's picket line at night, the chances are by the time she dived to get inside, and got any where near, the fleet would have gone past. To show how little chance there is for a sub to pick up a fleet, at night, that is steaming outside of the fifty-mile radius, let us suppose that there are twenty submarines in the harbor our fleet is investing. The fleet at night is somewhere outside the fifty-mile radius. The subs spread out fan-shape. At a radius of fifty miles they are five miles apart. If they travel in pairs, they are ten miles apart. They will pass a single ship a mean distance of a mile and a quarter, and a mile-long fleet (eight ships, double column, with allowances) at a mean distance of a mile. (Fig. 5). Query: Can a sub see a darkened vessel at a mile distant on an ordinary night?

Suppose she does. Can an eight-knot submarine catch anything? To blunder into a fleet at night *unobserved*, the sub must travel at some speed. To do that is apt to betray her presence to the pickets, and away go the fleet out of range, knowing that they are cruising in the dangerous zone, and, avoiding it thereafter, unless urgently needed there.

Of course if a sub *did* get in the middle of a fleet at night, it would be a nasty situation for the fleet, but not absolutely fatal to any ship. Luckily this unpleasant situation is a remote contingency with a fleet cruising outside the danger zone, and alert pickets ready to spot at once the white bone of a sub's conning-tower.

Let us imagine a general attack by the flotilla of submarines upon the investing fleet. They make a perfectly successful sortie (mechanically considered) from the harbor shown in Fig. 1. To avoid observation, they go out by day, traveling deep, and come

to the surface at dark, waiting for the fleet to cross their track. This is at their maximum of thirty miles. (Assuming that forty miles is their total submerged run, and that they must have ten miles reserve.) At thirty miles the fleet, in double column, would pass at a mean distance of one-half to three-quarters of a mile. This is on the assumption that the fleet does not start until dark, whereas it should be outside the danger zone *at dark*.

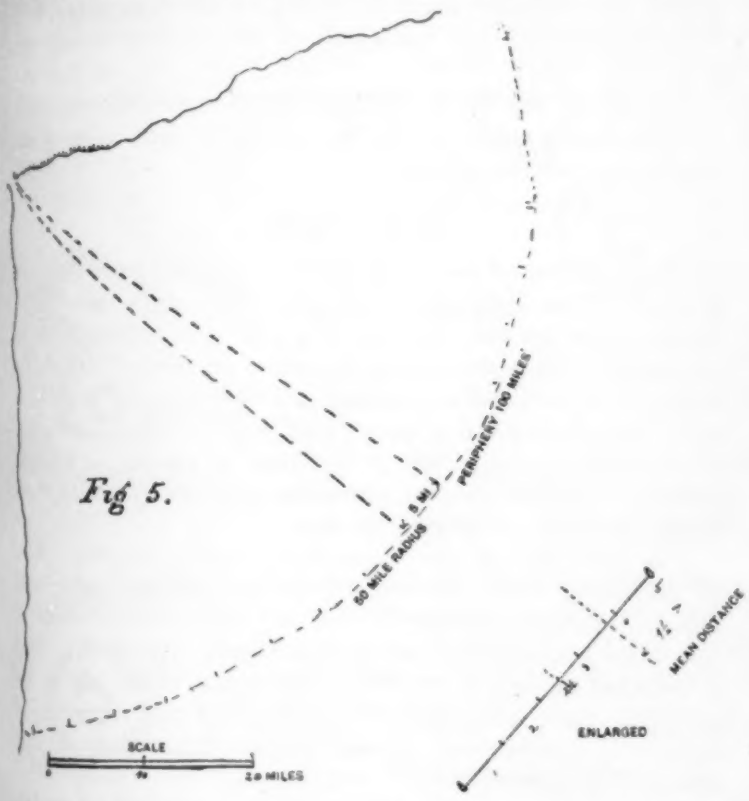


Fig 5.

Darkness having come on, the sub moves out awash and slowly, so as not to betray her presence, and would take four hours to reach the fifty-mile radius. The sub has no guiding light, as, at the speed the fleet is moving, there is no flaming at the stacks or bow wave. Therefore, to fall in with the fleet, she must blunder into it, under the long chances already stated. Also she must catch them inside her danger angle (Fig. 3), if she is to get near enough to risk a shot. Now, *if all* these things happen just so

(and, of course, they might, once in a great while), she has still to make a lucky shot at her target. For it must be noticed, that a mechanically perfect shot with a thirty-knot torpedo, fired at a target moving at right angles, at a distance of 1000 yards, has an error of 100 feet for every knot of error made in calculating the speed of the target. (Thirty-knot torpedo goes 1000 yards in a minute; ship moving one knot goes 100 feet in a minute.)

Now, in the danger angle the strongest part, structurally, of a vessel is presented, and the target is only from 80 to 125 feet wide.

It is a rare chance that will take in all these elements of uncertainty, and a submarine has to have *all* of them to bring her mission to a successful issue.

5. MANEUVERS.

The actual test of war is needed to thoroughly prove the truth or falsity of the foregoing statements. There are some of them, however, that we can very nearly get at by a systematic set of maneuvers. Up to the present time about all that has been shown with these boats is that a submarine is a submarine, *i. e.*, can travel under water and reach a known fixed mark. The following set of maneuvers is suggested as a starter to attempt to try and establish what a sub can and cannot do, under conditions approximating as closely as possible to war.

1. A convoyed sub goes to sea in all sorts of weather. How far can she go totally submerged? What could she really do en route? What can she see?

2. Make a submarine dummy for a target. Anchor it so as to be detached at will, to simulate a sub rising to the surface for bearings. Have it fired at by a destroyer that does not know just where it is going to rise, for one minute. Note effect. Ranges 1000 to 2000 yards.

3. *Attack of Sub by Day on an Unpicketed Vessel.*—A twelve-knot vessel goes to sea and steams in a five-mile square (Fig. 6). A submarine endeavors to go to sea and torpedo her, using collapsible head torpedo. This ought to be carried on a great number of times.

4. *Same Maneuver at Night.*—Use three-mile square.

5. *Effect of Wake on Torpedo Accuracy.*—Vessel going ten to twelve knots. Fire a torpedo at her stern at different ranges to determine effect of screw wake on accuracy.

6. *Visual Experiments.*—In different weathers—by night and day, submarine goes to sea and endeavors to pick up vessel, all her lights being screened. Results tabulated. Experiments at same time from vessel as to how far, if at all, sub can be seen. As to what extent bow wave shows on sub at night and day.

7. *Signal Drill by Fleet and Pickets.*—Pickets signal "sub discovered" and direction. Vessels follow out plan in such an event.

8. *Squadron Passes a Given Point at a Given Time at Night.*—Speed is unknown to subs. Two subs take station to intercept the fleet and fire collapsible head torpedoes at vessels passing. This is to simulate the case of two subs blundering into a fleet

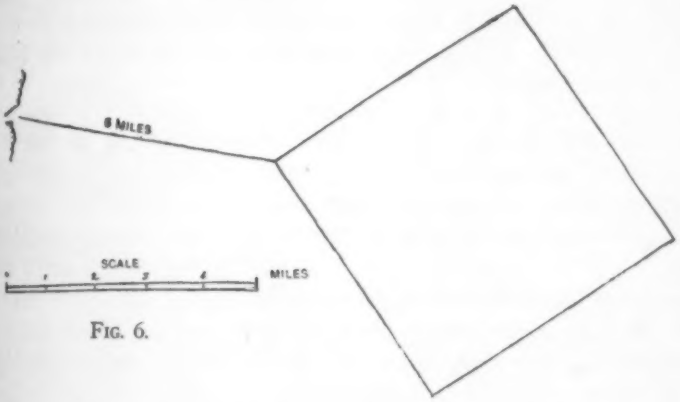


FIG. 6.

cruising at the fifty-mile radius at night. The fleet is, of course, on the lookout for them, but does not know where they may meet them.

9. *Same as the above except Position is only Approximately Known.*—This simulates submarines having picked up a fleet, increasing their speed and trying to get within range. Problem is to see whether they can get past the pickets unseen and hit a vessel.

10. *Day Attack of two Subs on a Fleet.*—Speed of fleet five to six knots. Position not known within ten miles. Two or more subs attempt day attack. Note results as to sighting subs, and entangling of subs in nets by pickets, or opportunities pickets have for sinking subs by gunfire. Fleet maneuvers out of range, at once, on discovery of subs, and pickets engage in fight with subs.

These then are some maneuvers suggested, and it is hoped that something of the sort may soon be tried, so that our knowledge of the subject may be increased.

In concluding this speculative essay the writer begs to repeat what was said at the beginning in regard to its purpose.

A recapitulation of this subject of the submarine as an enemy, brings out strongly, according to the writer's views, the fact that the great handicaps of a submarine have not altogether been considered, in the more or less fanciful rôles popularly assigned to it.

It is hoped that something in this direction has been proved. The sub is a slow, clumsy animal, but its bite is deadly. Keep out of its way, and at night don't betray your presence if you think any are about. In any event, they are not as apt to get you, as one is led to believe.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

NAVAL INSTITUTE, ANNAPOLIS, MD., MAY 13, 1905.

COMMANDER C. J. BADGER, U. S. Navy, in the Chair.

THE CHAIRMAN.—*Gentlemen:* When the Institute was first established, it was the general idea to have meetings at which papers should be read and discussions take place. As time went on, and it was found that few could attend these meetings, it became necessary to print the papers, and to print such remarks and criticisms as might be made. In accordance with the request of some members who are much interested in the success of the Institute, as I know we all are, this meeting was called, to try and revive in some way the interest in personal discussion of the papers that might come before it.

I am a little bit sorry that more of our people here have not attended, but I am sure that we have all the talent and expert knowledge on the subject of this paper on promotion, which will tend to bring our meeting to a successful conclusion.

I have to introduce Lieutenant Jackson, who will read us a paper on "Promotion in the Navy."

PROMOTION, PRESENT AND PROSPECTIVE.

By LIEUTENANT RICHARD H. JACKSON, U. S. Navy.

It is historically true that one of the results of war is a large increase in the naval and military forces of the victor, and though there may be attempts to return to the basis established previous to the war, a permanent increase of forces always results.

In the American navy this result has followed, with one notable and even astonishing exception—the number of officers constituting the fighting force of the navy has remained unchanged during a period in which the staff corps have increased two-fold or more,

the material three-fold, and the men, that this line, or fighting corps must train and command, have increased four-fold.

The causes which have produced such a remarkable condition, and the methods which may be adopted to remedy this shortage, will be discussed, and an attempt made to show that the plans herewith submitted will furnish the least violent, and yet efficacious method.

A brief review of the growth of the navy from a period previous to the Spanish-American war will first be made, citing a few figures to show that it has been more than quadrupled in size, and is yet endeavoring to get along on the original complement of line officers.

In 1882, the tonnage was 100,000, the men 7500, and the officers, line and engineers combined, 1091. In July, 1897, officers 921, men 8000. In 1898, just previous to the war, tonnage 300,000, men 12,000, and officers as before. August 15, 1898, tonnage 600,000, men 24,000, and line officers 1562, this tremendous increase being the result of a war lasting less than four months. The following year we find the peace footing as follows: Tonnage 600,000, men 14,500, and officers back to 1020, being nearly 100 less than allowed by law in 1882, the additional 641 officers drawn from the retired list and from civil life having been discharged or retired from active service.

On January 1, 1905, we have a tonnage, present and prospective afloat and under construction, of 800,000, 34,000 men, and no more officers than in 1882, when we had 100,000 tons and 7500 men.

In 1897, the Secretary of the Navy, having under consideration the personnel of the navy, appointed a board of eminent officers with President Roosevelt, then Assistant Secretary of the Navy, as chairman, to consider the general subject of the reorganization of the navy and a solution to the problem of stagnation. This board recommended legislation which became law in March, 1899, combining the line and engineer corps. It established a table of ratios for each grade from ensign to rear-admiral necessary for a flow of promotion, and compulsory and voluntary retirement, in order to maintain this flow permanently. This table of ratios will be discussed later. It also made the total number of officers 1020.

Extracts from the annual reports of the Secretary of the Navy and the Bureau of Navigation for the succeeding years will be

interesting as showing the needs of the navy, its subsequent development, and the legislation that has been enacted for that purpose.

1898. Previous to the passage of the personnel law of 1899, the Bureau of Navigation reported that, "The Bureau believes that an increase of officers can best be made gradually by passing this bill, and only making further increase as the growth of the service demands, thus giving the service institutions time to furnish trained men in the lower grades and to build up the navy homogeneously."

This bill increased the number of officers allowed by 99, the first increase since the reduction of officers by 170 in 1882.

1899. "The Bureau noted in its report of last year that the slight increase in the line as provided by the personnel bill might give but temporary relief. One of the most important features was stricken out—the change from 6 to 4 years' course; the number of commissioned officers intended to be provided for thereby was so reduced that it becomes necessary to ask that some relief be immediately furnished. The Bureau therefore recommends that the demand for officers for important service be met by *providing for a four years' course at the Naval Academy, and increasing the number of officers in each grade 10%.*"

1900. The Secretary of the Navy reports: "The need for officers is steadily growing, and at times the Department is seriously embarrassed by lack of necessary officers to properly man vessels required for immediate service. The need will be still greater when the vessels authorized or building are completed, and ready for commissioning."

1901. The Secretary of the Navy says: "The need for line officers for sea duty becomes steadily more pressing, and in case it should become necessary to man all the vessels of our present fleet the required number is not available, and I recommend that the number of lieutenants be increased from 300 to 350, and that the limit of the lieutenants, junior grade, and ensigns be made 600."

"England increases her personnel each year by adding enough officers to man her new ships. France proposes to increase her line and engineer officers by 537, adding 91 each year till complete. Germany provides for an annual increase for the next 20 years until the personnel is two and one-half its present size. I

recommend that the number of cadets at the Naval Academy be increased 50% as recommended by the General Board, and that there be ten appointments by the President, annually, at large."

1901. The Bureau of Navigation quotes from Mr. H. W. Wilson, a well-known authority upon naval affairs: "It is useless to provide ships unless there are trained officers and men to take them to sea. In this matter both England and the United States have shown grave want of foresight, increasing their material out of all proportion to their personnel."

Then follows a table in which the Bureau mans the ships in 1904, using a complement for each ship 30% lower than that allowed abroad, with the result that 825 additional line officers would be required at the time.

The report continues: "It is now necessary to inquire into the status of the legislation which provides for the supply of line officers to the navy, and in setting this forth the Bureau again furnishes the conditions as they actually are. Under the old law, and taking the average for the last ten years, there have been each year approximately 31 graduates available to fill vacancies in the line. Since there are created by the personnel act 40 vacancies per year above the grade of lieutenant, junior grade, and ensign, and since under the present law we cannot hope for more than 50 graduates per year to fill the vacancies in the line, it must follow that officers in the line can only be increased at the rate of ten per year, as shown above. Therefore, on July 1, 1904, the navy will have but 30 more than at present, while the number of additional officers necessary will be 1026, less the total of absolutely all officers now needed on shore duty (426), or 601.

"In the opinion of the Bureau there is but one remedy for this fatal error in our naval policy, and that is to increase the number of cadets at the Naval Academy. The new construction now under way at that station will enable the Government to accommodate comfortably about 800 cadets, and the Bureau believes that it was the intention of Congress, when it authorized quarters for such a number of cadets, that upon the completion of the works the money expended should not remain idle, but that all the cadets which the institute could accommodate should be educated, and the Bureau believes that the time has come when the intended increase should begin."

To this end the Bureau then recommended legislation which would have more than doubled the number of cadets then allowed.

"In opposition to such a marked increase to the appointments to the Naval Academy it might be advanced that a new hump would be created. *The present law provides for a fixed number of vacancies above certain grades in the service, and by increasing the number of vacancies above each grade in proportion as the grade is increased, due to the commissioning of officers, the possibility of a hump will be avoided. Then, again, this objection could be met by so adjusting the standards at the Naval Academy that only classes of a certain size would be graduated in any year, the size to be so arranged as to increase the number of commissioned officers gradually.*"

1902. The Secretary reports: "The most imperative need of the navy to-day is of additional officers. I cannot overstate this need. It invites the instant attention of Congress. The administration of the Department is embarrassed almost daily by the lack of officers below command rank. This condition has been approaching for some years and was clearly apprehended by my predecessor in office. It is acute to-day, and will be desperate unless there is early action."

Then follows a table showing the deficiency (1902) to be 571; and a table made by manning the vessels authorized and complete in four years, giving a deficiency of 1360 in 1906, the complements used being 30% below those employed abroad. Yet our ships should be allowed even more officers since we are compelled to man our vessels with green crews, having little or no knowledge of sea life, being the only material available in this country.

1902. The Bureau reports as follows: "It is urged that in order to provide for the yearly casualties in the service, and the needs of the vessels building, the following legislation be enacted:

"*Provided,* That from and after the passage of this act there be allowed at the Naval Academy two midshipmen for every member or delegate of the House of Representatives; and two for every United States Senator; one from the District of Columbia; and ten annually at large. *Provided, further,* That the number of lieutenant-commanders of the navy shall be 200, that the number of lieutenants shall be 350, and that the total number of lieutenants, junior grade, and ensigns shall be 700. *Provided, further,* That any midshipman upon successfully completing his four years' course at the Naval Academy shall be commissioned an ensign; *Provided, further,* That no midshipman shall be prevented

from being commissioned by any law limiting the number of lieutenants, junior grade, and ensigns; *Provided, further,* That the increase in the grades of lieutenant-commander and lieutenant herein called for shall be filled by promotion each year of not exceeding 25% of the total of the increase of each grade.

"The increase above provided for will be 30 lieutenant-commanders, 50 lieutenants, and 350 lieutenants, junior grade, and ensigns."

1903. The Secretary of the Navy reports: "Of the several officers in command of the 11 battleships, two are 59; one is 58; one is 56; and two are 55 years of age. The age of the officers who in course of time will be selected to relieve them will be about the same."

In discussing this subject the Chief of Bureau suggests as the only remedy for the evils attending the tardy attainment of command rank—a defect inherent in other naval and military systems—early compulsory retirements in the higher grades.

He says: "The process is simple and need not be applied to more than two grades. It may be briefly described as follows:

"An officer 50 years of age who has not attained the rank of captain will retire; and a captain who is 55 and has not attained the rank of rear-admiral will retire. It should be stated that this method in other services is accompanied by selection to a limited extent of officers for promotion in grades below that of captain.

"The Bureau further recommends that the total increase of 30 lieutenant-commanders and 50 lieutenants be made at once, and that midshipmen be commissioned at the end of the four years' course at the Naval Academy."

1904. The Bureau of Navigation having again referred to this point of age of commanding officers, the Secretary of the Navy reported as follows:

"I fully concur with the Chief of Bureau of Navigation in the opinion that the officers of the navy attain command rank too late in life. It is no disparagement of the senior officers of the service to say that we should have younger men in command of our ships in time of peace as well as in war."

"Attention is earnestly invited to the recommendations made by the Chief of Bureau respecting the need for more officers and men in order to carry on the work of the navy. It is useless to build ships unless provision is made to man, care for, and use them."

1904. Bureau of Navigation report: "In regard to the increase of personnel necessary for the fighting efficiency of our ships, our experience, especially in the development of gunfire during the last two years, has led the Department, after prolonged consideration, to adopt important changes affecting the organization of ships, notably the larger ones, and has shown that the previous estimate of the number of line officers required to man the fleet was far below the mark. The statement then (1902) allowed to our battleships only about one-half as many line officers as ships of the same class carried in the British, French, and German navies."

Then follows a table, manning our fleet according to this complement, showing the number required to be 2078, without providing for officers for auxiliaries, nor for details on shore in connection with equipping, refitting, and supplying the fleet, and other necessary work, which would amount to at least 600.

The report then continues: "The numbers in the grades of commander and captain should be considered in connection with the subject of the ages of officers of flag and command rank. Before leaving the subject the attention is invited to the fact that not all of the officers in the grades of captain and commander are available for sea duty, because of the presence in these grades of a number of officers of the former engineer corps who are by law restricted to the performance of engineer duty, on shore only. The July register shows 8 such officers in the list of captains, and 15 in the list of commanders. Of the first 10 lieutenant-commanders, 7 are ex-engineers who will become commanders before any of the before-mentioned 15 are promoted, thus making 15% of the commanders not available for sea duty. Further down the lieutenant-commanders' list there are 36 ex-engineers out of a total of 111; all these are available as lieutenant-commanders for sea duty; but when all of them shall have been promoted to commander there will be, allowing 25% for casualties, 25% of all of the commanders not available for sea duty. Later on, in the grade of captain, this proportion would be greater.

"The simplest remedy for this would be to provide that those officers of the line who are restricted by law to the performance of engineering duty only, shall, on reaching the grade of commander become additional numbers; some of them already are.

"With regard to officers below command rank, existing law

places no limit upon the number of ensigns and junior lieutenants, the supply of these being dependent only upon the number graduated from the Naval Academy, and the number promoted from warrant officers. As yet the increase due to the large recent classes of midshipmen has not begun to be felt; but it soon will be, and no additional legislation in respect to entries at the foot of the commissioned grades will be needed.

"There are now allowed only 350 lieutenants against 500 shown above to be necessary for sea service in regular men of war. As there would be considerably more than that number required for all purposes at sea in time of war, it is recommended that the number of lieutenants be fixed at 600. The law which requires ensigns to serve three years before promotion would operate gradually to fill up the vacancies in the list of lieutenants made by the above increase. The number of lieutenant-commanders now allowed is 200; it is recommended that this number be increased to 300, basing this number on the table above."

The writer has ventured to quote thus fully from the reports as the simplest and briefest way to place before the reader the progress made in legislation, and the actual condition of the personnel to-day.

SUMMARY OF REPORTS.

The need for more officers is annually more acutely felt, the number at present being practically the same as in 1881, the additional number needed, as cited in the last report, being at least 1500.

To meet this want Congress in 1902 doubled the number of midshipmen at the Naval Academy, the only practical source of supply. It has also authorized an increase in the lieutenant-commanders' grade of 30 and in the lieutenants' grade of 50, the junior lieutenants and ensigns to be limited by the number of graduates from the Naval Academy.

The questions then are: (a) How soon may this output of midshipmen be made available as commissioned officers; (b) how many officers do we need as a total, and how many in each grade; (c) how shall they be distributed to best advantage to avoid a hump; (d) the age of flag and commanding officers being too great, how shall it be remedied?

Since these questions all involve the roster of officers they must all be considered at the same time; and further, since Congress

has authorized a commensurate increase in the junior lieutenant and ensign grades only, there must be presented to its notice plans for increase of the other grades to meet the needs of the service, and, as noted in the official report of the last two years, some method of reducing the ages of the flag and commanding officers. Note that the ratios established by the law of 1899 have already been changed by the additions cited above.

Several of the recent plans propose a further change, increasing by 100 the number of junior lieutenants allowed by the law of 1899, and decreasing the number of commanders by the same number; it being claimed that the number in the command list is too great.

Another plan proposes age for grade retirement, to apply to captains and commanders only, till the respective ages are reduced to 55 and 50.

Another plan is to adhere to the ratios of the law of 1899, and to distribute the excess in the lowest grade throughout the other grades in this ratio, as soon as the number allowed by that law is exceeded therein.

Let us first take up for consideration this plan, largely the work of the officers of the U. S. S. Nevada, which being brought forward for discussion at the Naval Academy, and being approved in its general principles by the officers there, became known as the "Naval Academy plan." The following facts were introduced preliminary to the submission of the proposition:

That on July 1, 1904, the line of the navy consisted of 966 officers; that the line is still deficient 44 officers under the old personnel law, and 124 considering the recent increase allowed.

That Congress, having in view the great need for more officers, authorized the increase of midshipmen to a theoretical maximum of 983 at the Naval Academy. Such increased number to continue till June 30, 1913, and then the number of midshipmen to be reduced about one-half; and in 1914 still further by the withdrawal of Senatorial appointments by limitation of law. The number of officers who will qualify and be commissioned under the existing law cannot be stated absolutely, but may be estimated with considerable accuracy, and has been placed as high as 200 per year. If the conditions for qualification are assumed to be as they are now and have been for some years past, the number of graduates will be 200 per year. If as difficult as between the

years 1881 and 1897, we may expect about 150 per annum. Assuming therefore a mean condition, a conservative estimate gives us 175 a year, or in ten years a total of 1750 graduates; considering that there will be 40 vacancies above the grade of junior lieutenant each year, or 400 in ten years, we thus have a net increase in the line in ten years from the time that the first large class will have been commissioned, of 1350. This increase will begin in 1905 or 1907, according as the midshipmen may be commissioned after four or six years. The above facts prove conclusively that under the existing law the following conditions would obtain:

	1904	1905	1906	1907	1908	1909	1910	1914	1918
Rear-admiral.....	18	18	18	18	18	18	18	18	18
Captain.....	70	70	70	70	70	70	70	70	70
Commander.....	112	112	112	112	112	112	112	112	112
Lieutenant-comdrs.....	184	192	200	200	200	200	200	200	200
Lieutenant.....	324	337	350	350	350	350	350	350	350
Lieutenant, J. G. } Ensigns }	222	247	248	318	398	600	735	1275	1815
Total.....	930	976	998	1068	1148	1350	1485	2025	2565

Under existing law the total number of officers in flag and command rank is 20% of the total number, so that in 1918 the total number in command and flag grades would be only 8%. It is evident that the existing law will cause a hump more serious than that which confronted the navy after the civil war. Some legislation is obligatory.

The meeting considered the personnel law of 1899 as establishing the proper proportion of numbers in the respective grades, and that this was the only basis upon which to estimate the increase. This law was the result of the deliberation of a board of naval officers of high standing and experience especially selected for the purpose, and presided over by the (then) Assistant Secretary Theodore Roosevelt. That the deliberations of this board extended over several months and the question of the proportionate numbers in the grades was given the most exhaustive consideration; and that any substantial departure from the proportions in the several grades then established will inevitably result in permanent injury to the service, and the necessity for drastic selection for promotion in the navy.

That it is extremely inexpedient to advocate any further method of selection out, or forced retirement, than now exists, during such period as the navy is, and hereafter may be, in urgent need

of additional officers. The proposition which was then introduced was as follows:

When by the operation of existing law, the number of ensigns commissioned in any fiscal year exceeds the number of vacancies for that year in the grades of junior lieutenant and ensign as established by the personnel law of 1899, the several grades of the line of the navy shall be increased in such manner as to maintain the number in the several grades as nearly as may be in the same proportion to the whole number of line officers as was established by the aforesaid act, viz.:

Rear-admirals 1.76%, captains 6.9%, commanders 11%, lieutenant-commanders 16.66%, lieutenants 29.4%, lieutenants, junior grade and ensign 34.3%.

The following table illustrates the operation of the above law:

Grade	1905	1906	1907	1908	1909	1910
Rear-admiral	18	18	18	20	23	26
Captain	70	70	70	76	92	103
Commander	112	112	112	126	148	164
Lieutenant-comdr	192	200	200	200	224	250
Lieutenant	337	350	350	350	396	441
Lieutenant, J. G. / Ensign	247	248	318	374	465	516
Total	976	998	1068	1148	1348	1500

First increase is in 1908, because it will take till 1907 to fill the lower grades to the proposed ratio.

If the grades are increased in proportion and midshipmen are commissioned after the four years' course, same proviso:

Grade	1905	1906	1907	1908
Rear-admiral	20	21	25	27
Captain	77	84	97	110
Commander	124	132	154	176
Lieut.-comdr	192	204	238	267
Lieutenants	337	361	420	470
Lieut. J. G. / Ensigns	377	426	494	550

First increase comes practically upon passage of law, as class will be commissioned in February and promotion continue thus.

Provided that the number in the grades of lieutenant-commander and lieutenant shall not be reduced below the number now authorized by law. None of these tables take account of extra numbers.

To make the above table clear we will assume that in 1908 a class is commissioned containing 142 numbers; that the number established by the personnel law are then filled, viz.:

18 rear-admirals,
70 captains,
112 commanders,
170 lieutenant-commanders,
300 lieutenants,
350 lieutenants, J. G., and ensigns.

Assuming, further, that 40 vacancies exist, the net increase will be 102, or exactly 10% of the total line officers authorized by the personnel law. The net increase would thus be distributed to the nearest whole number as follows:

2 rear-admirals,
7 captains,
11 commanders,
17 lieutenant-commanders,
30 lieutenants,
35 lieutenants, J. G., and ensigns.

It was also proposed that those officers who, by operation of law, are no longer available for sea service should be placed on the list as extra numbers for the purposes of promotion and apportionment in the command and flag grades.

Why not apply this ratio of increase in grades to all grades immediately instead of waiting two or three years till the overflow commences in the ensigns' grade?

Since the navy, by action of existing law, will be doubled in about 1914 (an addition of about 1350 graduates net), apply this increase immediately so that its benefit may be felt at once, by increasing the number of officers allowed in each grade 10% each year for 10 years, to commence upon passage of this act, so that in 1915 the navy would consist of 2043 officers. The result would be the same in 1915 in either case. *Why wait three or four years before starting the distribution in the higher grades?*

Having now stated all the plans known to the writer as proposed for legislation, an academic discussion of the broad question of naval promotion will be introduced, with an inquiry as to the methods which should achieve the best results with a specific application to our own service.

Selection.—The first query always is: Shall we have selection? No one will deny the excellence of the theory of selection as a means of obtaining young officers for the command grades. It is evident that the best commanding officers would be obtained by selecting the most promising young men for this position, thereby giving them the opportunity to develop, and to assume great responsibility at an early age, to which would be coupled the resultant long years of experience in that position. In whatever walk in life this theory be applied, it is incontrovertible.

But in its particular application to our naval service two questions at once arise: Would the very best men be selected? and What would be the effect upon those not selected?

In answer to the first question, it would be generally, but not always, the best men as judged by the service at large.

In answer to the question of the effect upon the service, the advocates of selection, while admitting that there would be some discontent due to what, in the general opinion of the service, was an unfair choice, hold that the superiority of the commanding officers thus obtained would more than offset this discontent.

The opponents, on the other hand, who, now and always have been a very large majority, claim that the demoralization and discontent arising from even two or three unfortunate selections would be immeasurably greater than any possibility of better commanding officers could offset. This large majority carries with it, of course, the large conservative element which is particularly marked in naval life, who hesitate to adopt a new and radical system. The advocates of selection claim that the present situation is desperate, dangerous; the opponents, that it is not absolutely new, nor unparalleled, and cry, "Gently, gently; 'tis not a Gordian knot."

Having thus separated the navy into two parties upon the question of "selection for promotion," if we change the title to "selection of some sort" and invite discussion we get unanimous approval upon the general proposition; but with every shade of opinion upon its application, due to varying ideas as to the age beyond which a man *must* not be promoted in the command grades.

Age.—This leads us at once to the subject of ages in grades. The average naval officer now spends 44 years upon the active list of the navy, instead of 46, since he now enters at 18 instead of 16.

Curiously enough upon the "age for command grade" a compromise receiving, I believe, unanimous support, can always be effected, by taking the figures 45 for that age, provided the means for obtaining the result are not discussed. The radicals say, "45 will do, though we ought to have captains at 30. Look at England." The conservatives reply, "We are not England; besides 45 is early enough; an officer should have had experience in all the other grades; he may also get experience as a commanding officer in a small way in tug-boats, torpedo-boats, and gunboats; moreover, captains at 30 means selection, and that is impossible for our country and our service."

The following extracts are from official reports of the Navy Department upon the subject of age:

1903. The Secretary of the Navy: "The duty of commanding battleships and fleets of battleships is one which demands not only experience and ability, but also makes heavy draughts upon the energy and nervous endurance of the officers charged with such responsibility, upon which the success or failure of the navy in important crises may arise. The Chief of Bureau again brings to the attention the importance of devising some plan by which officers will attain command rank at an earlier age than under the present system. The Bureau is not prepared to say that the plan of age for grade retirement, applied to captains at 55 and commanders at 50, would find favor with a majority of the officers of the navy, but it regards some action in this direction essential to naval success in the future, and bases its views upon the evidence which naval history presents to us in regard to the ages of officers commanding vessels of the line of battle."

1904. The Secretary of the Navy: "The condition of our service in this particular promises to grow rapidly worse, instead of better, in consequence of the large influx of officers in the lower grades without corresponding increase in the upper grades. These unfortunate conditions are not confined to the captains list, but extend below to commanders and above to flag officers.

"Considering that future wars must be waged by young officers the Chief of Bureau of Navigation suggests that all captains upon reaching the age of 55 be retired; that this age limit be decreased one year for each two years till the age limit becomes 57; that this limit be reduced to 55 after the next two years; that all commanders after reaching the age of 55 be retired; that this age

limit be reduced as in the case of captains until it reaches 50; that no candidate be admitted to the Naval Academy whose age exceeds 17 years on the 1st day of October of the year his class enters; also, as a contributory means of relief, that officers whose services are restricted by law to shore duty only be made extra numbers in the grade of commander and captain.

"I am impressed with the importance of this recommendation. The interests of the service are paramount in such a matter and I believe that action should be taken to place younger men in position of command as soon as a way can be found to do so that does not involve injustice nor impose unnecessary hardship upon officers whose long and worthy service entitle them to consideration. Most of our ships and all of our shore stations are now short of officers, and with the completion of vessels now under construction this condition will become more serious."

The Bureau in reviewing the ages of our captains, as noted above, gives the following table of ages:

Nation.	Youngest.	Average.	Oldest.	Retirement Age.
England	33	48	54	55
Germany	45	48	54	None
Russia	45	50	59	55
Japan	36	44	51	53
United States	54⅓	57⅘	61⅓	None

The Bureau reports: "It is no reflection upon our commanding officers to say that we should have younger men; it is a statement of fact as regards physical condition due to age. The ceaseless vigilance and activity, the strain of great responsibility in modern sea warfare, require perfect elasticity of mind and body even in their prime. The ships bearing the officers of greatest importance are the objects of the enemy's constant and determined attack; so that on the sea the senior officers must bear not only the greatest responsibility, but also the brunt of the fighting; for them no relaxation is possible. The danger of the present condition is real and cannot be overestimated."

The quotations above cited from the official reports of the last two years, bring out in the most forcible manner the present age conditions in the upper grades.

Let us now read some extracts from the report of the chairman of the personnel of 1898, Mr. Roosevelt, to the Secretary of the Navy; and that of Mr. Foss, chairman of the Naval Committee,

upon presenting this bill to Congress, bearing particularly upon selection and age in grades.

Extract from the report of the chairman of the Naval Committee upon the personnel bill of March 3, 1899:

"This measure, treating the whole subject from the standpoint of the greatest naval efficiency, broad in its character, and affecting in its operation all the different corps in the navy, has, with comparatively few exceptions, if any, the support of the whole naval service.

"This means provides a remedy for stagnation; first, by providing for voluntary and involuntary retirement; and, secondly, by the re-adjustment of the numbers in the different grades of commissioned officers.

"In a navy organized to secure the highest efficiency, all authorities recognize that the number of officers in each grade must be adequate to the duties to be performed, and that the ages must also correspond to these duties. Further, that the number of officers necessary for subordinate duty is so much greater than the number in flag and command grades, that the ordinary retirement for age and for disability cannot provide for the promotion through all grades, and at the same time keep the age of the subordinate officers low enough to assure proper activity.

"To assure the maintenance of the average ages the bill provides that, in any year, when the number of vacancies due to retirement for age and the ordinary casualties is not up to a certain number in that grade, the necessary number shall be secured by permitting a limited number of officers to retire; and in case there are not enough applicants for voluntary retirement, then a board of admirals is to select enough additional ones, who will be recommended to the President for compulsory retirement. Not only does this assure the retention on the list, of the most valuable and proficient officers, but it also sets aside the least worthy, and they take their grievance, if they feel any (which is not anticipated), out of the service.

"The numbers in the respective grades were very carefully selected with respect to the actual needs of the navy on a *peace basis*, taking account of the number of ships likely to be commissioned for service, their actual needs, and the other absolute needs of the efficient conduct of the navy."

Extract from the report of Mr. Roosevelt, then Assistant Secretary of the Navy, and chairman of the Personnel Board:

"The statement of the problem is easy. To properly man our ships we need about three times as many officers below command grade as above it. By the simple process of consulting any set of actuary tables, it can be seen at a glance, that this system insures a man spending much the largest part of his life, including his most active and vigorous years, in a subordinate capacity, including normally a quarter of a century as a lieutenant, while at the very end, when long service in a subordinate position has dulled his energy, and probably rendered him unfit to bear the responsibilities, he is thrust for a brief period into command rank, and is galloped at an absurd speed through the grades of commander, captain, commodore, and admiral.

"*It was deemed best by every member of the board to try the process of eliminating the officers who were redundant, rather than of selecting the highest for promotion; for, although the latter method is ideally the best, it would in any event have to be combined with the other, and it would, in its actual working, be open to far graver objection.*

"The only difference in the board arose as to the best method of making it. The three dissenting members favor some scheme by which the officers who are taken out shall be so taken by chance, or as one of the members expressed it, 'without the intervention of human intelligence.' The majority of the board believe, on the contrary, that we should try to eliminate the men who are least fit to perform the duties of the grade to which there is to be a promotion. This does not mean that they are unfit to perform these duties, but merely that among all of the officers who are fit they are less fit than their fellows. Thus, to choose them out does imply the exercise of human intelligence; and whenever human intelligence is exercised it is always possible that it will err; but it does not seem to us that we can safely assume such errors to be the normal results of its exercise, if we are to go forward at all.

"Occasionally men will be put out that will be better than the least good of those left in; but it is safe to say that the best men will never be put out, as they sometimes would be if the outcome was left to chance 'without the intervention of human intelligence.'

"The majority deem that in separating the best officers from the worst, it is safe to trust to a body of the highest officers in the service who have the interest of that service peculiarly at heart."

A very large majority of the service hold the above opinion to-day; a recent vote upon the question of promotion by selection (*up*, rather than *out*) was voted down by 80% of votes cast (about 150 officers voting).

The following is an academic discussion by Captain Schroeder, submitted to the Naval Committee in 1894, which lays down clearly and concisely the principles involved and a solution.

ORGANIZATION ON PRINCIPLE OF FIXED PERIOD IN GRADES.

"If officers are to remain a certain number of years in each grade, say ten, there must be promoted from that grade one-tenth each year. Therefore, supposing no casualties, and that the waste is only by retirement at the top, the promotions to all the grades would be the same. For instance, suppose there were 100 ensigns and it is proposed that they shall remain in that grade for 5 years, then there must be promoted 20 a year, to junior lieutenant. This presupposes 20 vacancies in the junior lieutenants' grade, which may be brought about by making that grade of such strength and length of grade service that the former divided by the latter will produce 20; *e. g.*, 200 men and 10 years in grade, or 160 and 8 years, or 140 and 7 years, etc. There would have to be promoted 20 to and from every grade each year, including the grade of rear-admiral; and in order to let each admiral have three years on the active list, there would have to be 60 of them. In the same way for a captain to serve 6 years, there would have to be 120, and so on.

All this will be modified by taking account of the casualties of each grade, by retirement, desertion, death, resignation, and dismissal. The casualties in the navy during the past ten years have averaged as follows:

Ensign	3%	Commander	2½%
Lieutenant, J. G	2%	Captain	3%
Lieutenant	2½%	Flag	1%

In order to keep each grade up to its approximate strength the annual promotion to it, as given before, must be increased by that annual average number of casualties in that grade, and the strength of the grade below must be so increased that the fraction of it promoted each year will equal the increased number of vacancies in the grade above.

Assuming the age of entrance to be 15 to 17 (average 16), and the average of retirement to be 62, there would be 46 years of active service to be divided up. A proper division would be about as follows:

Cadet	4	Lieutenant-comdr.	5
Ensign	5	Commander	8
Lieutenant, J. G.	4	Captain	8
Lieutenant	7	Rear-admiral	5

Assume average annual casualties to be: Ensign, 5; junior lieutenant, 2; lieutenant, 5; lieutenant-commander, 2; commander, 2; captain, 2; rear-admiral, 1. Starting in with 20 admirals, 4 must be retired each year to keep them 5 years on the list, and as there would be one casualty, there would have to be promoted 5 captains a year; then there must be $5 + 2$ casualties $= 7$ promotions from the commanders; $7 + 2 = 9$ from the lieutenant-commanders; $9 + 2 = 11$ from lieutenants; $11 + 5 = 16$ from junior lieutenant; $16 + 2 = 18$ from ensign; $18 + 5 = 23$ from the Academy. Then the strength of the grades would be as follows:

Ensigns, 18 (promotions) by 5 years in grade						90
Lieutenants, J. G., 16 promotions, 4 years in grade						64
Lieutenants,	11	"	7	"	"	77
Lieutenant-comdr.,	9	"	5	"	"	45
Commander,	7	"	8	"	"	56
Captain,	5	"	8	"	"	40
Flag,	4	"	5	"	"	20

The total number of officers thus obtained is 392, or only one-half the number on the register (787). It is also to be observed that the number is absolutely limited by the number allowed in the grade of rear-admiral.

There are two ways in which the number may be increased: First, by increasing the numbers and the lengths of service in the lower grades; second, by providing an increased number of vacancies in certain grades by voluntary retirement, as suggested in the bill proposed by the Honorable Secretary of the Navy.

The first method is out of the question, as it defeats the very object sought, viz., attainment to command rank at a moderate age. By the table given above officers reach the rank of lieutenant-commander at the average of 36 and commander at 41. These ages should not be exceeded.

According to the compulsory retirement scheme the number of vacancies to be made must be fixed as found necessary. There is no way of increasing the captain's list without either increasing

the admiral's list, or making additional vacancies in the latter by compulsory retirement ahead of time, neither of which methods commends itself for that grade. But the grades below captain may be increased all the way down by vacancies in that grade, and the same may be done to the grades below it. It does not seem desirable, however to extend this method to include junior lieutenants, as officers of that grade would hardly have been long enough in the service to have very well defined records. If 9 vacancies be provided annually in the captain's list, 16 in commander, 25 in lieutenant-commander, and 42 in lieutenants, the vacancies would be as follows:

Grades	Regular Promotion.	Average Casualties.	Compulsory Retirements.	Total.
Captain	5	2	2	9
Commander	9	2	5	16
Lt.-comdr.	16	2	7	25
Lieutenant	25	5	12	42
Lieut., J. G	42	2	..	44
Ensign	44	6	..	50

And the lists would be as follows:

Ensigns, 44 × 5	220
Lieut. J. G., 42 × 4	168
Lieutenant, 25 × 7	175
Lieut.-comdr., 16 × 5	80
Commander, 9 × 8	72
Captain, 5 × 8	40
Admiral, 4 × 5	20
Total	775

It appears from the above that about 26 vacancies, besides the average casualties, are needed annually to keep the flow of promotion such that the present number of officers may pass through the grades in 46 years of service, the grades being of the strength and length of service suggested. These vacancies may be provided mainly by an annual scrutiny of the lists, as suggested by the Honorable Secretary in his proposed bill. Retirement for age in the different grades would be difficult to associate very usefully with fixed terms in the grades, as the lengths of service are so arranged, that an officer would be at the top of the lieutenant's list on completing 20 years of service; a cadet on graduation would know almost to a certainty whether or not he could attain the rank of lieutenant-commander. If the age limit in the lieutenants' list were fixed at 36 years, then, as a rule, all that were over 16 on entering the Academy would have no chance of passing beyond the lieutenant's grade. If the limit were 37 then, under normal circumstances the only ones that would fail on the age qualifica-

tion for promotion to lieutenant-commander would be those who lost a year (were turned back) at the Academy, or that were suspended from rank, or lost numbers from any cause after graduation.

The option of retiring after 30 years' service would probably make a limited number of vacancies annually, but only from and above the rank of commander.

The source therefore from which most of the required vacancies would be obtained would be by annual scrutiny of the lists, and the weeding out of those officers whose records and qualifications, mental, moral, and physical are such as to prove them to be the least worthy. Any system which undertakes to promote officers to command and flag rank while still of an age to begin the assumption of high responsibility will inevitably cause some hardships, and the theory of all such systems is that the hardships shall fall upon the least worthy, not as a punishment, but for the purpose of retaining the best for the service of the country. The plan of selecting for compulsory retirement commends itself as the one productive of the least heart-burning, the least jealousy, and in all probability the least injustice."

Now our present law endeavors to accomplish this result with the difference that the ages of reaching the upper grades is somewhat greater. The results which would be achieved under normal conditions are reckoned approximately as follows, allowing the graduates to be commissioned at the average of 22:

Rank.	Schroeder.		Law of 1899 Theoretical.		Law of 1899 Actual.		
	Age.	Years in grade.	Age.	Years in grade.	Age.	Years in grade.	Youngest Approx.
Ensign	22	3	22	3	22	3	20
Lieutenant, J. G.	25	4	25	4	25	1	23
Lieutenant	29	7	29	9	27	6	25.3
Lieutenant-commander	36	5	38	7	41	6	40*
Commander	41	8	45	7	49.5	6	48
Captain	49	8	52	7	55.7	6	54
Rear-admiral	57	5	58	4	59.6	2¼	57

*Youngest in Lieutenant-commanders' grade, May 9, 1905, is 36 years old.

The table shows that the proposed ratios are not working properly in the flag and command grades. The explanation is simple, the hump is now passing through those grades and off the list. Speaking of the hump, let us turn our attention to the Naval Academy, for we certainly have another one there.

Naval Academy.—The Secretary of the Navy says of this institution in 1903: "The main source of our supply must be from the Naval Academy. The duties of the modern naval officer are so varied and complex that they demand a rigorous and protracted education and training. This training can best be obtained at the national school at Annapolis. The school produces officers the equal of any in the world. When the best are obtainable we need not content ourselves with anything less than the best. The Nation has devoted many millions of dollars to the upbuilding of this school, instituted and maintained for the sole purpose of producing naval officers of the highest type.

"With the utmost wisdom Congress has prescribed that the students shall be selected from all sections of our country, and in practice all classes of our people are represented there. Naval officers do not constitute a caste; our system of selection brings to our service each generation the new blood of democracy. It admits none by favor, excludes all except those of the highest mental and physical vigor. Thus selected, thus educated, inspired by our naval traditions, we may be assured that these young men will reach and maintain the highest standard of efficiency."

Output and Selection.—By the law of August 5, 1882, the number of midshipmen commissioned from the graduates at the end of their two years' cruise was limited by the number of vacancies in the grade of ensign the preceding year. From this date until 1894 the number of graduates, although only 47% of the entries into the fourth class exceeded the vacancies, and 182 midshipmen were discharged between those dates. From 1894 to 1899 the number of graduates, though 50% of the entries, was not sufficient to fill the annual vacancies which in 1899 had increased to 26. The law of March, 1899, made 99 additional vacancies in the grade of ensign, which the graduates have not been sufficient to fill; so that now, January, 1905, allowing for the 70 vacancies since created, there are 124 vacancies. The law increasing the number of appointments at the Naval Academy will be felt in two or three years, as was shown by the table on page 410, where 70%, or 175, was taken as the probable annual output.

Let us now examine this 175, and see what it represents from the point of view of selection, for the benefit of the selectionists.

In a great many of the congressional districts the appointments are made by competition, and the average number of competitors may be placed at five, as a conservative estimate; moreover, in

those districts where the Congressman makes his own selection he is apt to take great pride in the future success of his appointee, and will certainly have a promising boy in mind among those in his district. Let us say that he only chooses the best one of five, so that for every 100 boys under consideration only 20 arrive at the Naval Academy to take the entrance examination.

The question of getting the better boy by open competition or by selection by the Congressman has been looked up and the percentage of successful boys at the Naval Academy seems to be about equal from the two sources. Hence the ratio of 1 in 5 from each source seems fair.

Age at the Naval Academy.—It is claimed that the age limit at the Naval Academy is now too high, the limitations being 16-20 years, instead of the limits 14-18 of 20 years ago. By taking the limits 15-17 years officers would be obtained younger, and more nearly of the same age, securing greater uniformity of age in each grade, and consequently more uniform retirement. The opponents claim: (a) That if the officers be commissioned at the end of the four years' course they will be officers just as young under the present age limits; (b) that 22 is young enough to commission officers; (c) that the course at the Naval Academy has changed greatly in 20 years, and instead of spending two years on grammar school education as formerly, the professional education is commenced immediately, and with the broad fields to be covered in ordnance, electricity, and engineering no time can be allotted to common school education.

Ensigns after 4 Years' Course.—As already seen this would give us ensigns at the age of 22 as heretofore, giving them responsibility at an early age. The following are some of the extracts from official reports upon this subject:

1899. The Board of Visitors recommends that the course at the Naval Academy be four years and that the midshipmen be commissioned, at the end of the course, as ensigns.

The superintendent of the Naval Academy made the same recommendation. He said: "The history of the present system of the two years' course at sea is such as to convince any one of its injudiciousness, of its wastefulness, and of its injustice to the officer. It was not adopted because it was thought excellent, but as an expedient to cut down the number of graduates from the Naval Academy at a time when the annually occurring vacancies were few."

1901. "The Bureau feels called upon to renew its statements of previous years as to the desirability of commissioning cadets at the end of the four years' course, instead of at the end of the six years' course, as is now the case. This is only a matter of justice to the young men concerned, since it places them on an equal footing with the cadets entering West Point at the same time, and further gives to them the pay of officers whose duties they are called upon to perform; and it will be of great assistance to the Department, since it will be enabled to order these officers to more responsible duty than is now admissible."

The superintendent of the Naval Academy recommended that since the average age at which the British line officers were commissioned was 20 years 8 months, and our own officers were being commissioned only when they were 25 years old, the age of appointments to the Naval Academy should be only between 15 and 17 years, and that the cadets should be commissioned upon graduation, thus approximating the ages for the two services.

1902. Report of Board of Visitors upon the subject of commissioning midshipmen at the end of the four years' course at the Naval Academy: "The Board is satisfied that they are entirely competent to do the work. As a matter of fact they are doing it without commissions, and without adequate pay, and without a proper position in the navy. We believe that common experience will justify the belief that the navy will be more efficient if responsibility is thrown upon officers at an early age. We believe that with proper care and selection the naval cadets graduating from Annapolis, or certainly the best of them, may be safely trusted with the responsible duties in their profession, and that the navy will be better in the long run if such duties are imposed upon the cadets immediately upon graduation from the Academy. Picked American youths as they are, mature, or can be made to mature, early, and in our opinion the earlier the better."

The same year (1902) the superintendent recommended that the age of admission be restricted to the limits of 15 to 18 years, that the course at the Naval Academy be four years, and that the graduates be then commissioned ensigns.

Such has been the tenor of the reports upon this subject.

The writer further advocates that the examination at the end of the three years, when they qualify for junior lieutenant, be somewhat similar to the one now given at the end of the two years' cruise, and that final standing in the next higher grade be

established by giving to the examination the coefficient of 250 (the old coefficient for the two years' cruise); total of coefficients at the Naval Academy 750 of the final 1000. In other words, the result of the three years as an ensign to count as one-fourth of the seven years. The coefficient might even be higher with better results. The coefficient now used at the end of the two years' cruise is so small (40 out of 800 and much less than the 4th class year) that it does not affect the final standing; and since the midshipmen all get commissions at the end of the two years' cruise, there is no stimulus to industry and application. On the contrary, the sudden and marked transition from close discipline and constant study to great freedom and few mental tasks, coupled with little or no responsibility, tends to laxness in performance of duty, carelessness, and idleness, habits only too quickly formed and difficult to eradicate.

This practically carries selection to the age of 25; but what is far more important, carries the youth through the formative period of his life under a constant stimulus to effort, and a reward for industry. How frequently are we struck with the change in the character of our apprentices during this period.

If a scheme for utilizing the English system known as the "five firsts" were adopted, it would be even more beneficial. By this system an English midshipman who passed "first class" in the five professional subjects in the examination for the grade of sub-lieutenant obtains his lieutenant's commission at once. It might be applied in our service by giving to all who obtain a star mark, 85%, on the examination for junior lieutenant an increase of certain numbers, say ten, provided it did not put him out of his class.

The following table shows the number of graduates since 1860. It also shows the number of candidates since 1883, the number of 4th classmen graduated, and the number commissioned, giving the percentage in each case. The year given, means the year the class graduated. On the right is an approximate table of retirements.

Upon examination of the table it will be seen that between the years 1881 and 1901 less than 50% of the 4th class was graduated, and only 32% was commissioned in the line and engineer corps. In the next 5 years 70% had been graduated, and 64% commissioned in the line. That during the 10 years between 1860 and 1870, the years that were graduated the largest classes, those that furnished the hump, the largest class of graduates was 88, and the average for the 10 years was 65.

That the law of August, 1882, was most severely felt by the classes of 1881 to 1891, during which time only 22% were commissioned, and that this excessive reduction will again appear in 1921 to 1931 as shown by the small number of retirements during those years.

TABLE OF GRADUATES SHOWING PERCENTAGES GRADUATED AND COMMISSIONED.

Year.	Number.	Year.	Number.
1860	25	1870	68
1861	88	1871	48
1862	—	1872	38
1863	50	1873	34
1864	35	1874	30
1865	59	1875	44
1866	74	1876	41
1867	87	1877	43
1868	81	1878	50
1869	78	—	—

Year.	Candidates.	4th Class.	% Entered.	Graduates.	% of 4th class Graduated.	Commissioned.	% of 4th class Commissioned.	Retirements.	
1879	—	—	—	64	—	—	—	1903	13
1880	—	—	—	79	—	—	—	1906	18
1881	—	150	—	96	64	10	7	1907	14
1882	—	104	—	59	57	20	20	1908	21
1883	—	86	—	46	53	16	18	1909	24
1884	—	77	—	43	56	20	26	1910	25
1885	—	78	—	37	47	22	28	1911	19
1886	—	63	—	25	40	13	20	1912	13
1887	190	118	62	44	37	24	20	1913	15
1888	154	90	58	35	39	23	26	1914	10
1889	166	86	53	35	41	23	27	1915	13
1890	161	85	53	34	40	23	27	1916	16
1891	161	97	60	43	44	29	30	1917	13
1892	139	89	64	40	45	22	26	1918	23
1893	126	90	71	41	46	29	26	1919	15
1894	137	81	59	47	58	42	52	1920	13
1895	124	84	68	39	46	34	40	1921	10
1896	107	77	72	38	49	35	45	1922	8
1897	162	93	57	47	51	41	45	1923	8
1898	152	83	55	39	47	37	45	1924	4
1899	195	89	46	53	60	49	55	1925	6
1900	183	97	53	61	63	54	56	1926	9
1901	163	94	58	67	71	50	53	1927	2
1902	115	93	81	59	63	55	59	1928	7
1903	109	69	63	49	71	43	62	1929	7
1904	149	93	62	62	66	60	64	1930	4
1905	235	148	63	110	77	110	77	1931	16
1906	444	150	33	120	80	120	80	1932	13
1907	881	313	36	250	80	250	80	1933	13
1908	663	297	45	260	83	250	83	1934	13
1909	500	250	50	175	70	175	70	etc.	etc.

This rate being taken for the subsequent years till 1918, when the numbers will diminish about one-half by the law which reduces the appointments after 1913.

The process of weeding out to reduce the numbers to these low percentages takes place under conditions absolutely fair to all concerned. Every midshipman at the Naval Academy is marked every day upon his knowledge of his studies, and monthly written examinations further assist in showing the true knowledge possessed by the student. Then, on the three months' practice cruise each year, especial attention is paid to their efficiency in practical work and exercises. So that at the end of the four years no one can deny that the position of the midshipman in his class is graded as closely as is possible for the human intellect.

If we further consider that only one boy in five has appeared in the above table we find that only 2700 boys have been selected out of 13,500 applicants, and of the original number only 675 have been commissioned.

Is there any military organization in the world where there is such weeding out?

Let us now examine the result of the output from there from now until 1914, when the numbers will be reduced one-half, so that an attempt to consider a longer period is hardly advisable. The numbers up to 1909 are reckoned from the classes at the Academy now; the subsequent numbers allow for a fourth class of 250 members and a percentage of graduates as indicated by the present course.

What is to become of all these young men, especially of the classes entering after this year? Not even as a result of a four years' civil war did we introduce such a hump; yet we have not fully recovered from that to-day. The excessive age of the officers in the commanders' grade is simply the hump passing off the list. Let us assume that our navy will be doubled in 1915, as it will under the present law, the true rate for commissioning graduates in 1915 would be 90 annually. Yet with the navy its present size we threaten to inject in two years 500 midshipmen—more than the entire hump of the civil war which stretched over 7 years. 150 a year, allowing between 40 and 50 a year for the casualties, and 100 net increase, is certainly the maximum that the navy list can take care of under our system of selection, a system which the general opinion of the service deems the best, needing only normal conditions and regulated supply of officers to give results as nearly satisfactory as can be hoped for in any military organization. Even this large number (150) graduating annually is only admis-

sible to meet the necessity for double the number of officers needed to carry on the demands of the service.

It must be borne in mind that any fluctuation from a fixed rate of admission at the bottom and removal at the top of the list will *always* give trouble, and the graduation of classes too small is only in a less degree unfortunate than the graduation of excessively large classes. It does not seem possible that there can exist any possible emergency in time of peace that would justify the graduation of such enormous classes, and the formation of a hump from which the navy could be freed only by most drastic legislation. Any one who will examine the table of graduates from 1860 till the present time can hardly think otherwise.

This is a matter that rests entirely in the hands of the Department and, as was shown by the report of the Bureau of Navigation which the writer has quoted in italics on page 405; its exercise was contemplated when the law allowing unlimited number of ensigns was passed. The navy has carried on its work ever since the Spanish-American war with a shortage of officers in order that none but regularly trained officers should be commissioned. Shall we, in our impatience to remedy this shortage, to-day take in more midshipmen in two years than we have ordinarily done in 15 years? Is it not better that the navy grow slowly and steadily by regular increments? Would not ten years be a minimum to place upon the date at which the navy should have doubled its size, instead of adding one-half in two years, as would now be the case?

The following is from the report of the Phythian Board in 1894:

"Great caution must be observed in filling the vacancies caused in the lower grades; for if too rapidly done there will infallibly result another accumulation similar to the one now deplored. The Board recommends that in filling the active list from the Naval Academy, the number of ensigns commissioned shall be 10 in excess of the vacancies occurring the previous year."

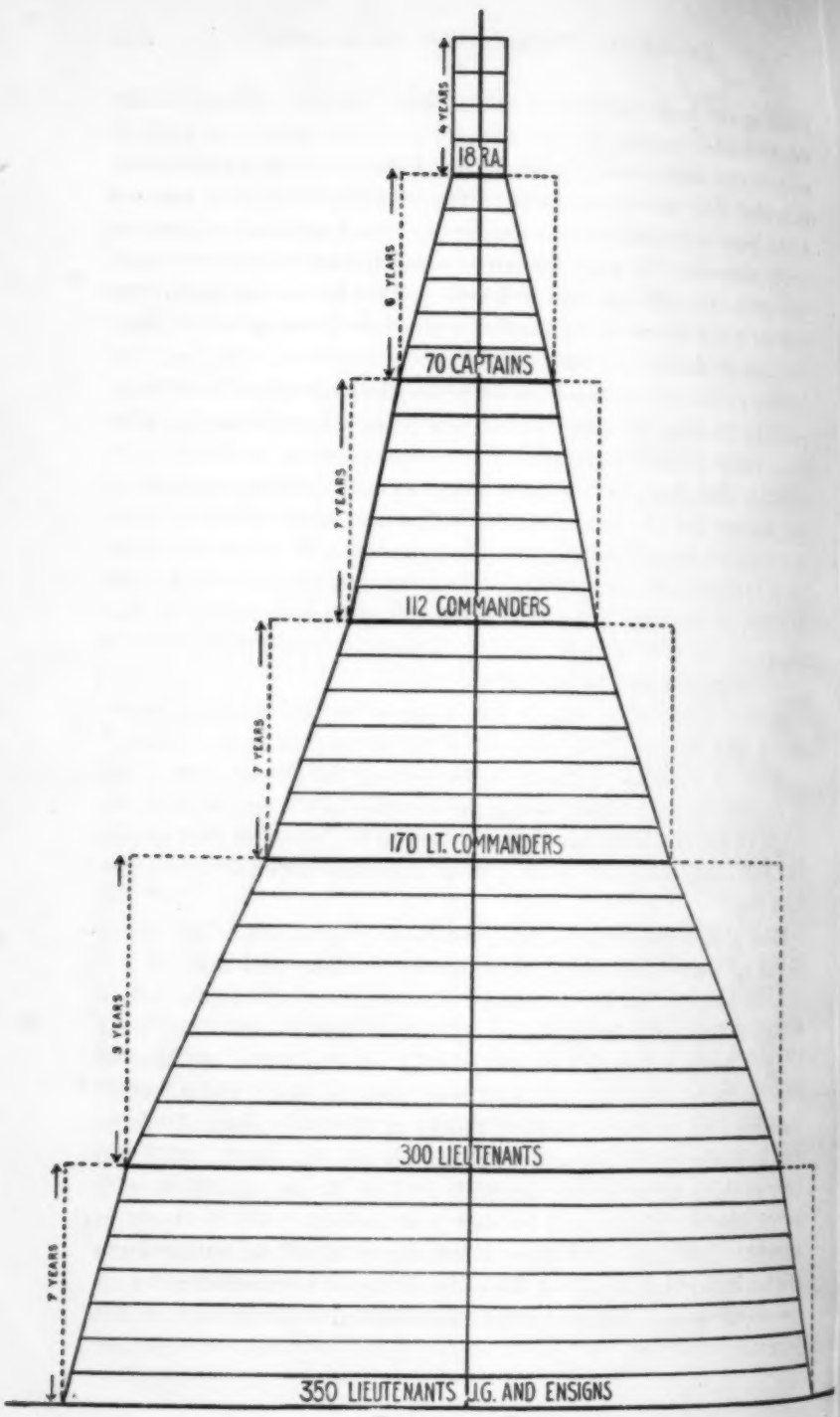
That there would be no difficulty in reducing the size of the classes graduated is evident upon comparing the percentages graduated now with the percentages of some years ago. It is a question if the percentage is not already too high, as a consequence of the desire to meet the demand for more officers. It would be a grave mistake to reduce in the least the standard of entrance to a career that becomes each year more exacting, de-

manding the best talent and ability that can be obtained. The character and quality of the classes varies but little from year to year, so that when we graduate 75% of the 4th class it can hardly be denied that we are accepting graduates that ten years ago we would have rejected. Nor is there the same application and industry shown by the midshipman as when the numbers were much restricted, and each one had to hustle to save his commission. So that for many reasons the further reduction of the percentage of the class graduated seems desirable.

Ratio in Grades.—The flow of promotion has often been compared to the flow of water through a pipe, a certain rate of flow being decided upon as necessary, the pipe must be constructed to maintain that flow, or we have stagnation. It being recognized that the number of officers needed below command grade is much in excess of those needed in those grades, some means must be taken to draw off this excess. That the number thus drawn off as waste be not too large, the constriction of the mouth or discharge of the pipe should not be excessive, *i. e.*, the number in command grades should be liberal.

Another illustration which has always seemed to show more clearly and forcibly the principles of promotion is a pyramid, made up of a series of blocks representing the grades, the width of the base of each block being the number in the grade, and the height of the block the number of years to be passed in that grade. The following diagram would then represent approximately our navy list.

Now, that there shall be an even flow of promotion, the upper corner of each block must be removed by wear and tear of service, or forcibly, so as to change this rough pyramid into a true pyramid, the sides being bounded by straight lines. The wear being a known factor and practically constant, the amount of material to be annually removed is at once known. The effect of inserting one or more 25-inch blocks at the base, instead of the 5-inch blocks as at present (classes of 250 instead of 50), and later pushing these stones up with 15-inch blocks, and then with 9-inch blocks, which will be our foundation stones in 1915, is evident. Since we must have a broader pyramid, let us use from the beginning the smallest foundation stone commensurate with the object to be obtained—the symmetrical enlargement of the pyramid.



Pyramid of Promotion.
Area within dotted lines removed by casualties and compulsion.

The question of the number of officers in each grade should not be decided by taking the number of ships of the navy, and assigning to each, one commanding officer, one executive, one navigator, etc.; but rather by deciding (a) the number of officers of the grade of lieutenant-commander and below that are needed for the service; (b) the approximate years that an officer should serve in each of these grades, fixing definitely the age at which he should reach command rank (generally placed at 45 or 46), then divide the period before retirement into three intervals of time, one for commander, one for captain, and one for rear-admiral. Having decided upon those intervals (for illustration we will call 46-52 for commander, 52-57 captain, 57-62 admiral) the numbers which will give a flow through this grade can be obtained by actuary tables, or by the actual records of the navy in the past. This will give a larger number in these grades than can be found in any foreign navy, and larger than we have employment for in our service. These numbers should then be reduced somewhat, bearing in mind that a reserve must be maintained in these grades for use in time of war, as commanding officers can neither be found nor created. The reduction of officers, to allow for the difference between the actuary table and the number needed, to be made by selecting out those least fitted for promotion, and retiring them with three-quarters of the pay of the next higher grade. The ages fixed by the Roosevelt board are given on page 421, and it is upon this principle that the promotion is governed to-day. It is giving satisfaction and is accomplishing all that was predicted for it, up to and including the grade of lieutenant-commander. It has not yet reduced the ages the proper amount in the upper grades, because it has not yet been able to throw off the hump which will not be completely accomplished for five years. If the lower grades are not in the meantime overcrowded with a new hump, the system from that time forward will give satisfaction to nearly all the service. It will be noted that the ages given in the table for captain is 52, and to be promoted to rear-admiral is 58 years. The selectionist claims these ages to be too great, and talks of rear-admirals at 48 and captains at 30. Now all this is impossible for us. If a reasonable reduction be demanded, two or three years for each grade, it can still be attained by this system. Simply apply compulsory retirement

to a larger number of captains.[1] But it first remains for the selectionist to prove the necessity for these reductions in age. When these ages were fixed upon by the various boards they were thought to be satisfactory; they give satisfaction to-day. The only charge made is that other navies with another system of promotion have younger captains, and that younger captains is what theory calls for. Now the writer is heartily in sympathy with the cry for young commanders, but he is willing to call 45 young. But having once obtained the position of commanding officer, he does not recognize the pressing need for the officer to wear an eagle instead of an oak-leaf. He has heard several excellent commanding officers say that after once commanding a ship it mattered but little to them what its size might be. It is the "Habit of Command," with all that goes with the term in its full sense, that must be learned; the earlier the better, but 45 is accepted as a reasonable age, and that we have, or will soon have. Another statement made is that there are not now enough commander's commands, and that the number of commanders should consequently be reduced. Why not then allow the commanders to command larger ships. As the ships are growing larger and larger, it is quite proper that the tonnage to which a commander is eligible be increased. It has been done once; if there be need for it, let us do it again. But to constrict the flow of promotion by reducing the number of commanders is illogical. With the large number of torpedo craft, gunboats, and small cruisers there seems to be no reason why a large number of officers should not have had experience of some sort before reaching the commander grade.

As regards the age for flag officers, the writer is willing to abide by the teachings of our own naval history, and the conditions as he sees them to-day. That we have excellent flag officers at 57 and 58 cannot be denied to-day; and the Department can and does choose the ablest and most vigorous for its important commands afloat. That the condition is desperate the writer does not admit.

Solution.—As already stated in the discussions of the plans advocated for legislation, the writer favors an increase of ten per cent each year to the number allowed in each grade by the Roosevelt ratio for ten years, thus doubling the navy at the end of that

[1] The English have an unlimited voluntary retirement for their command grades.

time, securing a steady increase in the grades during that period, and hastening the reduction of ages in the command grades to normal.

The following would be the wording of such a bill:

Be it enacted by the Senate and House of Representatives of the United States in Congress assembled, That the active list of the navy shall be composed of 1 admiral, 2 vice-admirals, 36 rear-admirals, 140 captains, 224 commanders, 340 lieutenant-commanders, 600 lieutenants, and not more than 750 lieutenants, junior grade, and ensigns: *Provided,* That the increase in the grades below vice-admiral, as hereby provided for, shall not, for any one year, be more than ten per cent for each grade.

SECTION 2. Officers in the line of the grade of captain, commander, and lieutenant-commander may by official application to the Secretary of the Navy have their names placed upon a list which shall be known as the list of applicants for voluntary retirement, and when at the end of any fiscal year after 1915 the average vacancies for the fiscal years subsequent to that date above the grade of commander has been less than 26; above the grade of lieutenant-commander less than 40; above the grade for lieutenant less than 58, and above the grade of lieutenant, junior grade, less than 80, the President may, in the order of the applicants, place a sufficient number on the retired list with the rank and three-quarters of the sea pay of the next higher grade to cause the aforesaid vacancies for the fiscal year then being considered. *Provided, further,* That from the passage of this act and until the grades have been increased as provided for in Section 1, the number of vacancies required shall be an annual increase of ten per cent to the numbers as now required by law in the respective grades.

SECTION 3. That should it be found at the end of any fiscal year that the retirements pursuant to the provisions of law now in force, the voluntary retirements provided for in this act and casualties are not sufficient to cause the average vacancies enumerated in Section 2 of this act, the Secretary of the Navy shall, on or about the first day of June, convene a board of five rear-admirals and shall place at its disposal the service and medical records on file in the Navy Department of all the officers in the grade of captain, commander, lieutenant-commander, and lieutenant. The board shall then select, as soon as practicable after the first day of July,

a sufficient number of officers from the before-mentioned grades as constituted on the thirtieth day of June of that year, to cause the average vacancies enumerated in the Section 2 of this act. Each member of the board will swear or affirm that he will, without prejudice or partiality, and having in view only the special fitness of officers, and the efficiency of the naval service, perform the duty imposed upon him by this act. Its finding, which shall be in writing signed by all the members, a majority governing, shall be transmitted to the President, who shall thereupon by order make the transfer of such officers to the retired list as are selected by the board: *Provided,* That not more than ten captains, eight commanders, eight lieutenant-commanders, and four lieutenants are so retired each year. The promotions to fill the vacancies thus created shall date from the thirtieth of June of the current year.

SECTION 4. From and after the passage of this act midshipmen that have successfully completed the course at the Naval Academy shall be eligible for commissions in the lower grades of the line or Marine Corps, the two years' course at sea being hereby abolished.

SECTION 5. All officers of the line now or hereafter by law becoming ineligible for sea duty shall at once become extra numbers on the list in their respective grades.

The writer has been prompted to bring this subject before the service for the following reasons:

(a) To demonstrate the danger of graduating the very large classes in order to relieve the present great lack of officers. There has as yet been no harm done, as no class of more than 150 members has yet been graduated; but unless the present classes at the Academy be reduced in size, a hump will be created and the navy will suffer greatly from it before the consequent stagnation can be relieved.

(b) To show that the present is a most opportune time to begin to commission midshipmen at the end of the course at the Academy, thereby partially relieving the lack of junior commissioned officers, and making larger classes at once available.

(c) To show the soundness of our present system of promotion, and to evoke a general expression of opinion from the ser-

vice upon this system, as well as upon selection for promotion, and retirement for age in grades.

(d) To bring before the service the fact that the navy will, by virtue of present law, double itself by 1915, and to suggest a scheme for applying this fact to immediate use, by increasing each grade 10% annually till this has been accomplished.

There soon must be some legislation for the purpose of distributing the junior officers throughout the grades, and, quite as important, an increase in the number of vacancies at the top of the list. It would be well for every officer in the service to seriously consider this fact, form his opinion, and put himself on record upon a subject of such vital interest to the future of the service.

The Secretary of the Navy must necessarily turn to naval officers for plans and suggestions relating to technical and professional questions. Among his official advisers are the officers of the General Board and the Bureau of Navigation. It has always seemed that if the Line Committee, whose sole duty is to consider the welfare of the personnel, particularly upon the question of promotion, could collate the opinion of the service and present to the Secretary any plan or measure advocated by a large majority of the officers of the service, that such a measure would be entitled to, and would be given, equal weight with a measure from any other source. If, further, the Line Committee could, by conferring with the Bureau of Navigation and the General Board, unite upon certain measures for the good of the service, and present to the Secretary such measure with the statement that the navy is practically united upon this proposition, the need for which is evident, the hand of the Secretary would be greatly strengthened, and the probability of obtaining necessary legislation thereby greatly increased.

The essential reason for the existence of a Line Committee is, as its name indicates, to represent the majority of the service. It is but fair then to the committee, that the officers of the service by individual or concerted action keep the committee informed of the needs of the personnel. It is earnestly hoped that the publication of this article will provoke a discussion upon this old, but most important, question of promotion, from which the opinion of the service to-day may be ascertained.

To the end that this opinion may be formed neither hastily nor without full knowledge of our present condition and of our experience in the past, the writer has collected in this article the facts and opinions of the last 40 years. Let each, then, "after maturely considering the evidence adduced, give his opinion without prejudice or partiality," remembering that—

"Experience, joined with Common Sense,
To Mortals is a Providence."

DISCUSSION.

Lieutenant W. W. PHELPS, U. S. Navy.—*Mr. Chairman:* It is a very excellent and thoughtful investigation of the situation. I take this opportunity of going on record as saying that I am for selection. I think it is coming; the President is for it, the Secretary is for it, and there are officers strong in the service who are for it.

Everybody admits—our essayist admits—that selection is desirable, but he says it is impossible. Now, why should selection be impossible, unless for the only argument we ever hear, namely, because of politics. We trust our Board of Admirals to select out the officers who are to leave the active list; why should we not trust our Board of Admirals to select the officers who are to be promoted? It seems to me that that way selection up is just as fair as selection out.

One reason why the service refuses to accept selection, and sticks to promotion by seniority, which, after all, is promotion by experience—that is a certain selection of course, selection by experience, the most experienced are the oldest officers generally—the reason why we do not accept promotion by selection is because we do not have a proper *esprit de corps* in the service. For instance, of our 38 lieutenants on duty at the Academy we have only 10 or 12 who are interested enough to come here to this meeting to-night. At the annual meeting of the Institute last fall I think we had about 20 members of the Institute present to elect officers. At the Graduates' Reunion, in June, we get about half or two-thirds of the officers on duty at the Academy to go to the reunion of their school here. I mention these instances as indicating a want of interest. The esprit, I think, is lacking. We ought to accept the choice and decision of the officers who reach our flag grades to make selection. I, for one, am willing to do it.

I do not think there will be a Secretary or a President, or a Senator, who would be strong enough to disregard the vote or decision of the Board of Admirals on selection in our service.

I have never heard any argument yet to the effect that selection did not bring the best to the top in any profession, the navy as well as any other.

It is very interesting and instructive to have had Mr. Jackson's investigation of this subject, and to have had him bring out many points that we have not carefully considered before. He makes a good point on selection while midshipmen, but that only covers six years of a man's life, and what is that in the life of a man serving the navy 45 years? Habits of carelessness might well be formed after six years in our lives that are not tolerated with the close supervision that we live under here as midshipmen.

Selection is splendid as long as we are midshipmen here, but after that we do not have any more selection.

If we are not to have selection it would be a stimulus if, now and then, we adopted the method of the medical corps, of turning back officers. We do not have it in the line, but once in a while you find it in the medical corps, that an assistant surgeon who comes up for promotion is turned down for a year. That would help.

We should pull together a little more as line officers, and should have a little more faith in the flag officers of our own school, and our own cloth, who have gone through it all, who have reached these high grades, and if we submit our cases to them, we would not suffer in the long run, and the service would be benefited.

Lieutenant RIDLEY MCLEAN, U. S. Navy.—*Mr. President and Gentlemen:* It is with considerable hesitancy that I take the floor to discuss a paper which evinces so much thought and preparation, and which happens to be on a subject to which I have devoted but little attention, but I rise to say a few words on the subject of selection.

Selection has apparently so few friends that it is almost a sacred duty of each believer in it to make himself known, however feeble may be his efforts in its behalf.

Much has been said and written on this subject of late, hence it is useless for me to occupy time attempting to show that because a midshipman graduates ten numbers ahead of another this year, he will not necessarily be a more efficient admiral forty years hence, or because he graduates *at all* he will necessarily be fit to command a ship, squadron, or fleet forty years hence. It is unnecessary for me to point out that, even were all men equally proficient, it is a pernicious system which permits each and every one of them to reach the senior rank—for only a little mathematics will show that where the number in that grade is 2 per cent of the total number of officers, omitting casualties, each officer would spend 2 per cent of his service, or less than one year, as admiral. Casualties affect these figures only as to degree—they do not affect the principle.

It will be noted that I differ materially from the lecturer as to the desirable age at which officers should attain the rank of rear-admiral. He gives it at 57 or 58, whereas I regard 50 or 52 more nearly the proper age. Without arguing this point, I refer the members present to the prize essay of this year wherein the essayist finds it necessary to coin a new word "admiralship," and points out the fact that duties which would fall under this heading are as yet practically undeveloped—that it is a new

field. Why is this? It is due to two facts. First, ordinarily when officers attain the rank of rear-admiral they have so little more time on the active list they do not feel justified in inaugurating new policies or systems—which we know are necessary to improvement—especially in unexplored fields; and second, because when a man has reached 60 or 61 it is the great exception if he has the energy to take up a new line of study in all of its details. So important do I regard the matter of having the tenure of office in the admiral's grade not less than about 10 years, I would favor nearly any form of selection which would accomplish that end, even if it consisted in selecting a number of lieutenants by lot with the intention of shoving them through. Though this may seem a wild statement, it would be a large improvement over the present method. Now *everyone* attains the rank of rear-admiral for about a year; by the above proposition those selected by lot would be *average* officers, with the advantage that they attain that rank younger, with an assured tenure of office great enough to incite them to advanced study and preparation for that grade, and also enough to enable them not only to inaugurate but to perfect such reforms as their studies had caused them to regard necessary.

This is to my mind the crying (but by no means the only) need for selection, and it cannot be accomplished by any practicable method, except by simply selecting officers for promotion, and advancing them over the heads of others, however harsh this method may seem.

I mention the necessity of early command rank as a principal reason for promotion by selection, because it is a reason frequently overlooked, and one on which I disagreed from the lecturer. But I will refrain from mentioning the other reasons because, as I stated in the beginning, so much has been said on the subject, and so many good reasons have been advanced in favor of selection it would be unnecessary to repeat them. The reason this is unnecessary is that every officer with whom I have seriously conversed has, after a little argument, invariably admitted the correctness of the *principle* of selection, but has taken refuge behind the threadbare statements that "It will not promote the best men," or "Who in the service knows the best men?", or "It will be a matter of political or family influence," or "It would cause heart burnings and discontent which would be pernicious," or "Look at selection in the army," or "We favor selecting out instead of up." In short, that though it is theoretically the correct thing, it simply isn't applicable to the naval service. My purpose is therefore to attempt to show the fallacy of the above excuses and to show that it *is* practicable for the naval service, and that it *will* work.

Considering these objections singly:

It will not promote the best men. It is hard to say that it *will* promote in the exact order each man according to his ability, but so far as the service goes *only good men* will be promoted, and certainly *notoriously bad men* will not be promoted. Thus, only *good* men attain command rank, while *bad* ones remain somewhere below, for there are several stepping stones extending over a period of years on any one of which the less surefooted are liable to slip and fall. Of these *good* men that are selected from grade to grade, it is a sure thing that certain individual

officers who have distinguished themselves in, say, the lieutenant's grade, and been selected early in their lives for lieutenant-commander would likewise distinguish themselves in that grade (while possibly others equally promising as lieutenants and selected at the same time might grow indolent and fall by the wayside). Those lieutenants who are thus selected for early promotion to lieutenant-commander *and who continue their efficient work in that grade* will be early selected for commanders, and so on. Thus *some* of those selected from the bottom (not all of them) would continue their luminous careers and hence reach admirals' grade, say, at 50. These may not be absolutely the *best* men in the service, but it would certainly be a grave criticism to state that they were not *good* men, or, indeed, that they were not probably *among the best;* but even if they were only the average, as I have already stated, the fact that they attain admiral's rank at 50 would, in itself, be sufficient cause for selection. But they are *not* average officers; they are above the average; they have been repeatedly reported upon, by various officers, and selected by various boards, and they *are* among the best; and, besides that, the scheme I shall propose will not leave any good, zealous, and efficient officer behind. Hence, though the *best* may not be on top, only the *good* are on top, the *best* are somewhere around there, and the *bad* are somewhere down below.

It would cause heart burnings and discontent which would be pernicious. So it might, but those who have attained or are en route to command rank, those actives who make the service what it is, those whose spirit and energy and zeal give to the service its spark of life—their hearts are not burning. For such men the chance for early promotion is an incentive to even further effort. Such men are the ones who gain positions of responsibility, while those suffering with the heart burn will remain in subordinate grades where, with active superiors selected for their energy and ability, their attack of heart burn can do little harm; for if energetic superiors cannot hold such men up to their duties in spite of their heart burn our discipline is indeed bad. But I think the case is overdrawn. I think, as a rule, it would work the other way. I think it would cause nearly every officer worthy of that name to take a keener interest in his work, in view of the inevitable result if he is inattentive. An analogy may be drawn in the competitive feature which has been consistently followed in the instructions for target practice. The fact that certain ships, divisions, and officers must stand last on the list has not yet elicited a protest. To the competitive feature is due all the success of the system, and if a ship stands last one year she, as a rule, instead of getting mad, gets busy and shows up higher the next year. This is due to the fact that every one knows the competition is fair and square. If we get a fair and square system of selection, based on merit, why shouldn't it work equally as well?

In answer to the objections "Who in the service knows the best men?", "It will be a matter of political or family influence," or "Look at selection in the army," I will attempt to propose the general features of a system which I believe would be practicable and which I think answers the objections; in other words, a fair and square system based on merit.

First. As for army selection, it is unfair for anyone attempting to get at the merits of selection to even mention that system. Everyone knows that to reward an army officer by selecting him for promotion he can only be made brigadier-general, and that the selection is purely in the President's hands, where necessarily personal and political influence have the greatest weight. The most ardent selectionist would never advocate a system like that for the navy, hence it should be dismissed from consideration.

Now, as to the other questions, I would unhesitatingly reply that no one man, or no one board, or no two boards know, say, who the best ten lieutenants or the best ten lieutenant-commanders are. Also, that selection is *not* necessarily a matter of political or personal preferment, because the law can be so formed as to prevent this.

How would a scheme like this work? The details are undoubtedly subject to revision—I refer to the general scheme.

Suppose the general features of the following plan were made a law.

1. Officers will be promoted in order of seniority until they attain the rank of lieutenant.

2. Promotions from the grades of lieutenant, lieutenant-commander, commander to be made by selection from among the upper half of the list of officers in these respective grades. Officers attaining a certain age (which should be fairly well advanced, since we wish to utilize their services as long as practicable) to be placed on the retired list for age in the same way they are now retired at 62. Officers who are eligible and who have been passed over, say, for five years, to have less important duties, while the personnel of the battleship squadrons would be made up of officers whose chances for selection were still good. (This to minimize the theoretical effects of heart burnings and disaffection already mentioned.)

3. No officers of these grades will be promoted to the next higher grade except those who have been selected by two boards composed of officers senior to them in rank in the manner hereinafter described. The names so selected will be submitted by said boards to the President, who will, if he approves, promote them to the next higher grade, by and with the advice and consent of the Senate.

4. Should the President not approve of any one or more of the names submitted, he will return the recommendation to the boards, who will, in similar manner, nominate other officers selected in the prescribed manner to replace the names of those which were not approved by the President.

5. The boards on promotion will be convened twice a year, or more frequently if necessary.

6. Both commanding and executive officers will submit regular reports on officers their junior, and these reports shall include a reply, on oath, to the following question: "If ten officers of his grade were to be selected for promotion, would you recommend this officer for selection?" "If twenty were to be selected, would you recommend him for selection?"

Replies to contain explanatory remarks for information of the Board of Selection.

7. The boards will be governed entirely by the reports, but will give

necessary weight to the personality of the officer making the report, and when recommendations and other features are equal, giving preference to the senior.

8. Each member of the junior board will carefully examine all the reports of each officer of the upper half of the grade, and, supposing ten are to be promoted, each will make out a list of the 50 officers whom he considers best qualified for promotion. The members will then come together, tally their individual votes, and as a board agree on 40 names out of the upper half, then arrange these names in the order in which that board recommends them for selection. The lower half of the list is then cut off and the first twenty names forwarded, without being in order, to the senior board. This board is limited in its nominations to these twenty names. Each member will, after careful examination of the reports of these twenty officers, arrange them in the order he regards them best qualified. The board then assembles, tallies and arranges the names in the order which the board finds them best qualified. The first ten names are taken and submitted in proper order to the President of the United States.

Certainly there is a minimum chance for political or personal preferment; even if it appeared on some one occasion there would be two different boards the next time this officer came up for promotion. Certainly personal or political preferment would be the great exception rather than the rule.

Now a remark in regard to the relative merits of selecting *up* and selecting *out*. Few people seem to realize that selecting out is absolutely contrary to the principles of human nature, while selecting up is directly in accord with it. It is the difference in the ease of saying "No" and "Yes." It is in accord with human nature to compliment, to say good things when they are deserved, yet the reverse is difficult. It is especially in accord with the spirit of naval officers to be lenient with their fellows; that is, not to visit hardships on them, however well merited they may be, while on the other hand they are naturally lavish in their praise and appreciation of work well done. A board which would never in the world throw a man out as long as he had a single good quality, even when that good quality only consisted in his never having been reported for drunkenness, would gladly pass him over to reward some officer whose record showed that he was zealous, efficient, and able.

Some anti-selectionists say: "Let the board have authority instead of throwing a man out to leave him on the list, so he wont be out in the world, and take the next man who is qualified." My reply to that is "Assuredly!", for the man who makes such a suggestion is a selectionist pure and simple without knowing it.

Lieutenant I. V. GILLIS, U. S. Navy.—*Mr. Chairman:* Having returned from the East only a short time ago, I have not had a chance to look into this subject as I would have liked, but I have seen something of the various arguments advanced in the *Army and Navy Register*. My chief objection, which I wish to record, against selection, is not as to the theory

of selection, which is excellent, but the principle. It seems to me that in any naval service selection is impossible to be carried out practically.

You can base it on an examination; officers are stationed in all parts of the world, and at all sorts of duty. If they are stationed in a place favorable to study, they come up to the examination and pass well. If they are placed on a station where they cannot study, they will pass an inferior examination. If you base it on sea service, then excellent officers who have duty in the Navy Department, or Indian Head, or stations of that kind, will desire to go to sea, simply to get promotion, and the service will be denied their excellent work. If you base it on selection, pure and simple, officers in out of the way posts will not be known by the board that selects them. Officers in the immediate vicinity of that board—Washington for instance—will be known in every way, and probably will be selected.

These are my objections to promotion by selection as a practical and not as a theoretical man.

Lieutenant H. O. STICKNEY, U. S. Navy.—*Mr. Chairman:* I have not seen this paper by Mr. Jackson, and am not at all prepared to discuss the subject, but I am glad to see that someone is willing to voice his objection to selection, and I would like to second it, and to say that I am unalterably opposed to selection for several reasons.

One thing I would like to call attention to is that I frequently hear a comparison made between the navy and civil life. The statement is almost invariably made that everything goes by selection, according to merit, in civil life. Now, is that so? In any banking corporation, or business concern of any kind, in civil life, if a man is incompetent he loses his job; if he is competent he generally holds it; but the men *promoted* are very apt to be the sons, cousins, and friends of the president of the corporation. I do not know that I have any better ground or knowledge to base this statement on than others present have, but I believe if you will look it up you will find it is almost absolutely true. It is simply human nature. The president knows these people. He is not personally interested in knowing whether John Jones is a very much better man than Sam Smith is, but he *is* interested in knowing whether his own nephew, or his wife's nephew, is a good man or not; he either knows it or he finds it out, and if the nephew is a good man he gets promoted—and often he gets promoted regardless of qualifications.

Another feature of the thing, as regards the service itself, speaking of the question of heart burnings that may be developed, I believe this: What we need in the service is team work. If we have a large ship, a battleship, with a commanding officer who is the finest in the service individually—may have been promoted two or three times by selection—if he has a first lieutenant and five or six watch officers jumped over by selection, I do not believe that ship is going to be anything but extremely inefficient. I do not believe she can possibly be efficient. I go a step further and say that the captain and the first lieutenant both may be two of the best men in the service; if the watch officers are dissatisfied because they have been jumped over, this feeling of dissatisfaction, I believe, will make the ship inefficient.

If you have a baseball team here at the Academy, and every man is working for his personal record, I do not believe they will win the games; if they are all working for team records, and every man is willing to make his own record a secondary consideration, I believe the games will be won, and I believe this principle holds good in the service.

Lieutenant H. O. STICKNEY, U. S. Navy.—The question of promotion by selection having been discussed in connection with Lieutenant Jackson's timely paper, I desire to add a few words to my remarks made at the meeting of the Institute, on the 13th instant.

Probably every officer in the navy, especially those who have been instructors at the Naval Academy, will concede that no system of selection can *insure* getting the best men at the top, for the reason that no perfect system has yet been devised. It is well known that the best students do not necessarily make the best officers—and it takes war to show whether an officer is a good admiral or not, as it took war to give us General Grant and a host of other military and naval heroes.

A few believe we can get *better* men at the top by some system of selection. No system has as yet been elaborated and placed before the service in a finished form capable of definite acceptance or refusal. Until some such scheme has been presented to us it may seem, perhaps, a little hasty to say one is "unalterably opposed" to selection.

We are constantly told by advocates of selection, that in civil life men who are the most capable rise to the top.

I deny that this is so, and with the innumerable exceptions that can be seen every day around us I fail to see how these statements go unchallenged.

Opportunity makes the man, more frequently than the converse.

Thousands of bright young doctors, lawyers, and other professional graduates start their careers every year, and who are they who succeed quickest and best? The answer is unmistakeable. It is *they who have influential connections to push them along.* The man without such friends struggles along in obscurity, unknown, and with praises unsung. Lucky he is if he ever rises above the point of paying his necessary expenses. But one in a thousand of these men, without powerful friends, ever becomes a shining light; that is, *ever gets selected.*

I have mentioned this to knock down one straw man so frequently set up by the advocates of selection.

The most striking examples of the failure of "selection" are to be found in civil life.

I believe that selection in the navy would be more nearly "a square deal" than it is in civil life, for I have more confidence in our ability to select according to merit.

But with all this, until the day comes, when, if you or I are smitten on the one cheek we will meekly turn the other, the day will be far distant when either of us will do our duty cheerfully and zealously after being turned down to make room for our juniors who were "on the spot" and had the opportunity, especially if we are ordered to serve under them.

I believe the selection we have now is far reaching enough; and who will

deny that the exercise of that power during the war with Spain was the primary cause of one of the most unfortunate controversies in the navy that the service has recently seen? Well exercised as this power was, it but emphasizes my statement when I say that if selection is extended to include peace times, and other than to the grades of flag officers, we shall see a contented, hard-working personnel transformed into one full of discontent and heart burnings, where each man is neglecting four-fifths of his duty in order to distinguish himself and shine in the eyes of those who will be called upon to select officers for promotion—and where each man is jealous of his mess mate. Will this bring about greater efficiency?

I would like to add a word in regard to the training of midshipmen.

During the next ten years about half the line officers in the service at the end of that period will have passed through the Naval Academy.

Is there any duty to be done in that period of time more important than the proper education of such a proportionately large number of young officers?

I believe the number of officers available as instructors at the Academy is less than half the number that should be employed in this important duty, and I believe that the service would gain infinitely by placing in reserve, if necessary, enough ships to provide at once the requisite number of officers for the training of these young men.

I consider this question of far more importance than the age of admission of midshipmen, or the question of promotion by selection.

It is a subject for *immediate* action—the other questions are not pressing.

Rear-Admiral F. E. CHADWICK, U. S. Navy (writer not present).—My own view has long been that a certain proportion of promotions should be made from each grade by selection, going down a limited distance only, and that the greater proportion of selections should be in the lower grades. This would be an additional incentive to men when young, though I do not know that they can work much harder than they do now. Selection should never, in my opinion, be as complete as in the British service. It is too uncertain a method, even if we have a general concensus regarding a man. You can never really know how a man is going to turn out until he meets the crisis. But it will work well to a certain degree, and a partial system should be tried.

Captain RICHARD WAINWRIGHT, U. S. Navy (writer not present).—Lieutenant Jackson's lecture is very timely as bringing before the navy a question most vital to the efficiency of the service. The subject is fully and fairly discussed, but I regret that he fails to refer to the report made in 1895 by the joint committee of Congress of which Senator Hale was a member.

I cannot agree with the conclusions of the lecturer, for I do not think he has given sufficient weight to the present needs of the navy.

There is an absolute need of more officers and the yearly increase proposed by him meets this want too slowly. In place of paying heed to Lieutenant Jackson's demonstration of "the danger of graduating the

very large classes in order to relieve the present great lack of officers," it behooves the authorities to strain every effort to graduate as many as practicable. For this reason it has been recommended that the term at the Academy be shortened to three years until the need for more officers is less pressing.

It is true that in filling up the lower grades by graduating large classes a "hump" will be produced, and that some method to remedy this evil must be adopted. For this purpose the reserved list for age in grade has been proposed.

In the lecturer's bill the number of officers in the upper grades is out of proportion with that in the lower grades. It would be impossible to give a reasonable amount of sea service to the officers in the command grades.

He is also in error on the question of the age of flag officers. He says "that we have excellent flag officers at 57 and 58 cannot be denied to-day and the Department can and does choose the ablest and most vigorous for its commands afloat." There is no admiral as young as 57 and only three under 59 on our list. The age at which captains are promoted is on the increase, and soon only a few will have as much as two years on the admirals' list.

It is important that an admiral who is to command a fleet in time of war should have some prior experience in handling a division, squadron, or fleet. Five years at least should be spent on the admirals' list. Hence the recommendation to place captains over 57 on the reserved list.

The problem confronting us is an old one. There are a large number of officers needed in the lower grades with comparatively few in the command grades. If all pass slowly towards the top, the only vacancies being casualties and retirements at 62, many must retire as captain, a few squeezing over and forming the admiral's list, and all or nearly all will spend too short a time in the upper grades.

The true pipe line system (Lieutenant Jackson's is a variety) requires the several grades to be made up according to the needs of the service, and to apportion the years, between graduation and retirement, among the several grades, so that the proper time will be spent in each grade. Then add to casualties and retirements the number of forced retirements necessary to promote the lowest number in a grade in the time assigned to that grade.

In order to avoid an excessive number of forced retirements, Lieutenant Jackson, in his variation of the pipe line system, has increased the numbers in the command grades beyond the needs of the service and they are out of proportion with the lower grades.

The theory of the bill approved by the Secretary of the Navy last January was to increase the officers to meet the service requirements as rapidly as practicable. To make the numbers in each grade to accord with service needs, to bring the age of officers gradually to a reasonable limit, and to prevent stagnation in promotion by a limit of age for sea duty in upper grades.

I firmly believe that the above method far more nearly meets the needs of the service than the bill proposed by Lieutenant Jackson, and that less injury will be inflicted on individuals.

There are two weak points in this method. One is the large number of officers of high rank that will be reserved for shore duty; and the other is the discouragement for the older men with lack of incentive to exertion for the younger.

The first objection is more apparent than real. There is a growing need in the government service for experienced men who are outside of politics and above ordinary temptations. It will cost less to maintain an efficient service when the surplus is actively employed than when it is shelved on a retired list.

The second objection could be met by filling a portion of the vacancies in the lower grades by selections made by a board of officers with continuing responsibility.

No scheme can be proposed that will meet all objections, and many variations may arise between the extremes of "vested rights" and "pure selection." It is to be hoped that the bill which has received the approval of the Secretary may meet the views of those who study the subject.

Medical Inspector H. E. AMES, U. S. Navy.—Of course this question of selection bears more directly on the line, and I can only speak from my observation. I will not speak of the line side, but in some of our staff corps we have had selection in a way. Certain of the higher positions have been filled by officers who have been selected, not by a board of officers, but by one or two men who simply had the political pull. They have invariably gotten the plum, and not from merit at all; in fact, it is well known throughout the rest of the corps that they were not the best suited; but there was no possible way of beating them out without creating great discord, not locally in the corps, but perhaps throughout the country, or say, in the navy itself.

Owing to the peculiar condition of our country, our institutions and laws, I do not believe selection will work satisfactorily; it may do very well in foreign countries. Indeed, while we are apt to say that the higher billets under monarchical forms of government are filled by capable men, it does not prove that there are not a great many men who would fill them more satisfactorily.

It does not follow that a man need have scientific ability, as long as he has scientific instincts. I do not believe, speaking from the staff's side of it, that selection (we have it; but it has not been left to a board, but to an individual; the principle is the same) has brought about that success that we would like to have.

I think one trouble is that when it comes to promotion in the line, there has been too much carelessness in scanning a man's record. We know any number of men where board after board has turned them down, whose influence would eliminate those who opposed their advancement, and substitute others, and keep eliminating until they secured a board that would pass the individual. The physical record goes for very little, and in many cases the mental record goes for very little. It is simply the peculiar condition of affairs in our country that enables some people to work a scheme of that kind, and I can go back, if necessary for thirty years, and cite case after case.

Again, a great deal could be done, particularly when it comes to selection from the higher grades, say to command rank. There may be nothing particularly against a man, so far as his ability to do this, that, or the other, is concerned, but they do not look into the man's ability or power to control other men. There are many men that are promoted to higher rank who are scholarly and able; they can do almost anything, but when you come to place a great many people under their control, they are entirely lacking, and will do more damage to the service than perhaps an inferior man, with the power to command men, would do.

Another feature is in regard to the young men entering the Academy—reducing the age. I think it would be a great mistake. It is known, so far as psychology is concerned, that in the youth of 15 the mind is not developed, and it follows of course, if you are going to take them at 15, unless you can select out of a great many the number required, you are going to fail, because it is apparent that it is preparing and not advancing the mind, as the intellectual centers are not developed until 17 or 18 years of age. That is now recognized in all institutions of learning, and instead of reducing the age I think it would be far better to keep it as it is. I would say from 17 to 20. Make the standard higher, give them the full four years' course, and graduate them as ensigns, instead of giving them the two years at sea.

I only speak from observation, but I think if there is anything of value I have gained from my observation on board ship, is in noticing the young men after commencing their sea duty, for the two years after they leave here I would say that probably eighty per cent of the young men devote about an average of one-half of one per cent of their time to study; the rest is simply performing duties, and not using their brain. I think it would be a great mistake, from the intellectual side, to reduce the age here. I am not as much interested as the rest of you are, but simply speak as an outsider might. As Admiral Goodrich says, "A lieutenant who cannot head his company and lead it up a hill should not be given a position of that kind; he is not fitted to hold that rank."

Professor P. R. ALGER.—I would like to say a word in regard to the age of entry into the Naval Academy.

I am personally a strong believer in lowering the age limit. I think they should enter younger than they do here at present. If Dr. Ames' opinion is correct, that they should be older, then we should demand more of them. A man getting in here at 19 or 20 should know what a man of bright mind, at that age, ought to know. We are now handicapping ourselves. We are putting a premium on stupidity by insisting upon the age limit being at a certain point, and the requirements those which should accompany fewer years.

The proposition of the General Board to reduce the age limit I heartily agree with, but it seems to me almost ludicrous to accompany that recommendation by another recommendation that we shall also reduce the length of the course. I cannot understand how the two recommendations can go together; they want to lower the age limit and cut down the course

to three years. If we would raise the age limit as Dr. Ames proposes, and also raise the entrance requirements, we might very readily cut down the course, but the proper thing, it seems to me, is to cut down the age limit and increase the length of the course at the Academy. Take them at 15 and graduate them at 20, after a five years' course, and they are ready, properly equipped to be given commissions.

Lieutenant R. H. JACKSON, U. S. Navy.—The Doctor speaks of the age 15 to 17; that is the age advocated now by the General Board in Washington. Probably the bill referred to by Captain Wainwright also mentions that.

I mentioned this suggestion as to age largely as a matter of discussion. At that time I was not convinced, in my own mind, what might be the best age. I now put forward the ideas which have occurred to me since then, which may be taken for what they are worth.

The question of age at entrance was looked up here, when the age was from 14 to 18 (a good many things have been investigated here, and that was one of them), and it was discovered, during Captain Ramsey's time, that the most successful, so far as you could make a rule out of a large number of figures, were in the younger 50 per cent; that is, those between 14 and 16 were the most successful men here. Now, if we had the age from 15 to 17 we would take in boys who are fresh, at that time, on the various subjects upon which they are going to be examined. The candidates who come here to-day get down to their old books, and look up the subject again, thus wasting a year, or two years, studying something else, when they must go back to this examination to freshen up.

Again, if we admit these facts, and it seems to agree with the opinion of the examining board, and the investigation under Captain Ramsey, if we limit the age to two years, we stop a lot of repeaters, people who fail here on their first appointment. If they happen to be 16 at that time, they don't get in. If they bilge at the end of their first year, they do not get back again, and we know that, as a rule, if we would select out the people that we drop out from the bottom here, they are the people who, we must admit, are the least desirable of the lot. So that, if this system takes boys at the time that they are just fresh upon those subjects, they have not wasted any time in civil life. If it prevents the bilgers from getting in, and it prevents the people who fail to get in from coming back here again, those people are handicapped right through; if they should go into the service at 25 or 26, they are away out of their place, and always will be. So that the more I thought of it the more it seemed to me that 15 to 17 would be a fit age, and if they were graduated then at 21 we would have them exactly on the same basis as the English lieutenant, whom we hear so much about as being right up to the mark.

Now, I stated in one paragraph that "we have to-day excellent flag officers at 57 and 58." That is a fact; that is the age of our flag officers, and I do not think there can be any great criticism of those that are given the most important commands to-day. If we look back and see who had the important commands in our navy, we find the admirals of 57 and 58

The table given by Captain Schroeder, and the table arrived at by the board of which President Roosevelt was the chairman, both agree upon 57 or 58 as the age which, in our country, under our conditions of service, was a fair time for a man to become an admiral, and give him five years on the admirals' list. I think that has been the concensus of opinion of people that have taken up the study of ages, and the application of it to our service.

Another very important thing is that by an entrance age of 15 to 17 they would all be of the same age at the same grade; for instance, you would have no man six years out of his class.

There is another point that comes up just now. The same thing occurred once before. When I was an ensign, there were in the steerage ensigns 30 to 35, who had never stood watch, and who could not get into the wardroom, because ensigns were not wardroom officers. Now, it seems to me that to-day we are doing something of the same kind. We say we would like to have lieutenant-commanders at 36, and that we want the important billets of navigation, executive, and ordnance officers on battleships given to men with that age, experience, and rank. Well, to-day we have the age and the experience, but we do not have the rank; so what must we do but insist upon taking lieutenant-commanders only, no matter if their age be 47. Why then should not lieutenants at the head of the line be detailed for these billets?

Lieutenant-Commander W. IRVING CHAMBERS, U. S. Navy (writer not present).—This paper shows evidence of systematic, careful, and thoughtful study. It is opportune, and I think its author deserves the profound thanks of the service.

The "selection" question is aptly summed up, and I agree with the author that the age of 45 years to enter command grades is not too old. It is Utopian to hope that it may be less. The condition of our *personnel* affairs may not yet be "desperate," but unless the right thing is done very soon it will not be long before our present dilemma will develop into a desperate condition.

There seems to be unanimity of opinion that midshipmen should be graduated as ensigns, and if this be combined with the author's idea of carrying the selection system through the formation period, by requiring competitive examination when qualifying for junior lieutenants, after these officers have been tried in their duties on board ship, I think the problem will be simplified.

The principles of the Personnel Law of 1899 had, practically, the support of the whole naval service. Elimination of the officers who were redundant rather than of selecting for promotion was the key note to its popularity. It provided a remedy for stagnation by voluntary and involuntary retirement and by a readjustment of the numbers in the different grades of commanding officers. The numbers in the respective grades were carefully selected with respect to the actual needs of the navy on a *peace basis*, taking account of the number of ships likely to be commissioned for service, their actual needs and the other absolute needs for the efficient conduct of the navy.

If now we find the conditions changed, that our policy requires a certain number of ships (so many of each class) at the end of a certain period, and that modern requirements place a larger percentage of officers in the lower grades on those ships, or disturb the former percentages in any way, we are bound to readjust those percentages. Furthermore, if we are to have those ships efficient in every way at the expiration of that period, we must provide a means for finding our quota of officers complete by that time. Our percentages then should be based not on the so-called "peace basis," but in accordance with a well considered and competent program, to perfect which we should consistently strive.

Fluctuation from a fixed rate of admission at the bottom and of removal at the top should be avoided as much as possible. But where it is impossible of avoidance the evils that lie in the wake of fluctuation must be provided for in some other way, as, for example, by varying the rate of removal along the line.

To keep the flow normal the number in command grades should be liberal. The extension of commanders to larger ships seems unavoidable and, in order to maintain this liberal percentage in command grades, while providing for sufficient sea experience to all, the period of command may be somewhat shortened or lengthened from time to time to suit the varying conditions.

For the sake of investigation, let us assume that, for good and sufficient reasons, it has been determined that our effective fleet (entirely aside from the multitude of auxiliaries that are usually added in event of war, to officer which we may depend largely upon the retired list and naval reserves) is to be at a certain date, say 1920, as follows:

Vessels.		Captains or Commanders.		Lieutenant Comdrs.		Lieutenants.		Lieutenants J. G. and Ensigns.	
Class.	No.	For Each	For All	For Each	For All	For Each	For All	For Each	For All
Battleships	48	1	48	4	192	8	384	12	576
Armored Cruisers....	24	1	24	4	96	6	144	10	240
Blockade Scouts or Cruisers	48	1	48	2	96	2	96	..	....
Torpedo Destroyers .	75	..	..	..	..	1	75	4	300
Colliers, 1st class ...	30	1	30	..	..	1	30	3	90
Supply Ships.	6	1	6	1	6	1	6	3	18
Depot and Mine Ships.	3	1	3	..	..	1	3	4	12
Torpedo-boats	100	..	..	..	..	1	100	1	100
Totals A.....			159		390		838		1336

For the 48 battleships, 24 armored cruisers, and 48 scouts, 120 in all, allowing one flag officer to each four vessels, there should be 30 flag officers.

	Flag Officers.	Captains or Commanders Ch. of Staff.	Lieutenant Commanders Flag Lieuts.	Lieutenants Flag Sect'y Flag Ord. Officer.	Lieutenants J. G. or Ens. Flag Signal Officers.
Totals B .	30	2	25	50	25

Allowing to the shore establishment as follows, practically the present meager quota:

	Flag Officers.	Captains or Comdrs.	Lieut. Comdrs.	Lieuts.	Lieuts. J. G. and Ensigns.
Navy Department, War College, Inspection Board.	....	45	44	24	....
Naval Academy	....	5	....	....	....
Light-house and other important boards	1	21	6	....	....
Receiving Ships and Naval Stations	6	48	22	36	....
Totals C	7	99	78	80	0
Totals B	30	2	25	50	25
Totals A	....	159	390	838	1336
	37	260	493	968	1461
Casualties	4% 1	2½% 7	2½% 12	2½% 24	2½% 36
Grand Totals	38	267	505	992	1497
Subtract quota for 1905	18	182	192	337	247
Divide by 1920—1905 = 15	20	85	313	655	1250
Number to add per year	1.3	5.7	20.8	43.6	83.3

Total to add per year for 15 years 1.3 + 5.7 + 20.8 + 43.6 + 83.3 = 154.7.

The above assumes that all those in command grades that are restricted to shore duty only be regarded as extra or additional numbers.

The following table shows the theoretically perfect system of increase to fulfill the conditions of the assumed program:

Rank.	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920
Flag Officers	18	20	22	24	26	28	29	30	31	32	33	34	35	36	37	38
Captains and Commanders	182	187	193	198	204	209	215	220	226	231	237	243	249	255	261	267
Lieut. Commanders.	192	212	233	253	274	294	315	336	357	378	399	420	441	462	483	505
Lieutenants	337	380	424	467	521	564	608	651	695	738	781	824	867	910	953	992
Lieutenants J. G. and Ensigns	247	330	413	538	579	662	745	828	911	994	1077	1161	1245	1329	1413	1497
Totals	976	1129	1285	1480	1604	1757	1912	2065	2220	2373	2527	2682	2837	2992	3147	3299

The above table shows that the yearly increase advocated by the author is nearly adequate to satisfy the demands of a building program such as we have assumed.

With such a table before us, the harder problem remains, i. e., how to obtain these relative numbers in grades and, at the same time, to keep the flow of promotion so as to have officers attain command rank not later than 45 years of age and flag rank with at least five years to serve.

Want of time prevents me from enlarging upon the means to accomplish the theoretical conditions outlined, but it is hoped that these ideas may assist eventually in arriving at a practical solution of the problem. This should be possible after mature consideration of all the points brought out in this paper and its discussion.

Captain E. B. BARRY, U. S. Navy (writer not present).—I do not know which to admire the most: the way Lieutenant Jackson has marshaled his facts, or the temperate manner in which he suggests remedies.

The past shows us that each spasmodic increase of the navy from the bottom has resulted in a "hump," clogging promotion and doing more harm than good. The remedy, a reduction of the upper grades, has been worse than the disease, thus blocking more completely the promotion of the younger officers. To be sure, we have had but little voice in our own affairs in the past, but nowadays there seems to be a tendency to let us ask for things with a strong probability of their being obtained, provided we can give adequate reasons for our requests.

I always have been opposed to the so-called final graduating examination; it is false in principle and false in practice. There is not a midshipman who could not get higher marks if he took it two years before he has to pass it. I am fully in accord with Lieutenant Jackson in his advocacy of an examination three years after real graduation with a coefficient not greater than 300 nor less than 250, assigning the remainder of the final 1000 to the Naval Academy. Frequently the poorest officers are the most scholastic. As Lieutenant Jackson says, this practically carries selection—but a well balanced selection or rearrangement of scholastic and service excellence combined—to the age of 25. There it should stop.

I should not like to see the English scheme of "five firsts" adopted here even with the suggested modification, which I think would not work. Suppose, for example, that Nos. 1, 2, 4, 8, and 14 took "five firsts," what increase of numbers would they get? Evidently Nos. 1 and 2 none; No. 4 one number; No. 8 four numbers, and No. 14 ten numbers, while No. 3 would lose three numbers, and so on. Probably Nos. 3 and 5, even after being pushed down, would have better finals than 4, 8, and 14.

Attention should be given to the remark embracing the percentages of graduates, the present shortage, and the dangers from too precipitate a remedy. Of this I speak feelingly for I have stood marking time on the very crest of the old hump for many years. Pray we do not aid in repeating the blunder. Better, far, double our work for years than open the floodgates to untrained political appointments to the detriment of the Naval Academy and of the service at large. As Lieutenant Jackson says, let the navy grow slowly and steadily and by regular increments.

I am fully in accord with the idea of grade service and length of service in each grade. To make it of any value, however, it must be made absolutely impossible for any officer to do the duty of a higher grade. Therefore the duties of each grade should be so sharply defined there could be no way even for a political favorite to evade grade requirements.

I should like to see age for grade established (for the "good of the service," that is, provided it does not affect *me* unfavorably!), but it should be reached by very slow degrees. Let me use my own case as an illustration. Had the age bill passed the last Congress I should have tottered feebly along, an aged and decrepit commander, *almost* having outlived my usefulness, unfit to command the smallest gunboat, but suddenly by a fortunate vacancy I burst forth a young and vigorous captain,

physically capable of commanding the largest of battleships. Such change is too radical. Until it is proved that the old fellows are too old, ease them down gently. I see nothing very alarming for our future in our fossil captains, because there is not a captain on the active list to-day as old as Farragut was when he began making history.

There are two methods, it seems to me, that must combine to make a proper age and a proper flow for each grade: 1st, increase all command grades in accordance with an expanding service; 2d, slowly and steadily reduce the age until the intervals as given by Lieutenant Jackson are reached.

One grade, however, never can be touched, and many a worthy captain will retire with his well deserved flag in sight but just beyond his reach. Nothing but death or age will change the grades of admiral, so there always must be a stagnation among the senior captains, since many more men will reach the age of 57 in four years than that of 62 in less than one year.

The pyramid of promotion is a good illustration of the excess requirements and shows how unavoidable is the reduction that must take place in each grade.

Lieutenant Jackson asks why not allow commanders to command larger ships? By all means. I think the tonnage assignment for command is all wrong. No tonnage should lap in quantity from one grade over into the next. All men-of-war should be rated by displacement, and all merchant steamers, all so-called converted *cruisers,* colliers, etc., should be designated as "special" rates and also be rated by displacement, beginning, however, with special 2d rate. In the assignment of commands no captain should be allowed, under any circumstances whatever, to command a "special rater." This would add materially to commander's commands.

In the bill, as given by Lieutenant Jackson, I think lies a solution of the vexing problem of promotion flow for 1915. Fixed retirement vacancies should be approached on an increasing scale, governed by the percentage of increase, thus approaching by easy stages the vacancies required when 1915 is reached, and should not be so largely increased at once, as in section 3 of the bill.

I am fully in accord with Lieutenant Jackson as to the duties of a line committee; "its sole duty is to consider the welfare of the personnel." By all means let us have a line committee that is the voice of the navy; let it have its principal headquarters in Washington or anywhere else if necessary, but there should be a member of the committee at every station, ashore and afloat, through whom quiries for opinions should issue. No action should be taken on any matter of moment until the opinion of the majority of the service can be presented to the Secretary of the Navy.

Finally, lest it may not be gathered indirectly from my remarks, I wish to record myself as opposed to any system whatever of promotion by selection, except by "selection out."

Captain BADGER, U. S. Navy.—I wish to say that I congratulate the assemblage here on the success of our experiment. The meeting has not been large in numbers, but it has certainly been very valuable in the arguments that have been brought forth on this very important subject, and as I observe some unsettlement on the part of the members I shall cut short the long speech I intended to make. I think it is now in place to thank the essayist of this evening for his valuable paper, and for the ideas he has drawn forth on the part of those who have made remarks on the subject.

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U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

DESCRIPTION OF REPAIRS TO S. S. SHAWMUT AT THE WORKS OF MORAN BROS. COMPANY, SEATTLE, WASHINGTON.

By NAVAL CONSTRUCTOR T. F. RUHM, U. S. Navy.

The Shawmut having broken her stern-post, a new forging was ordered from the East and shipped to Seattle, where it was desired to remove the old stern-post and fit the new, and no dry-dock being available for the work the following mode of procedure was adopted:

The Moran Bros. Company have a small floating dry-dock capable of docking a vessel of about 3000 tons, while the Shawmut is a large vessel belonging to the Boston Steamship Company of the following dimensions:

Length between perpendiculars	488 feet.
Length, over all	505 feet.
Beam, molded	58 feet.
Draft, loaded	27 feet 3⅛ inches.
Displacement, loaded	17,200 tons.
Water bottom capacity	2,100 tons.

It was decided to form a cofferdam around the stern and to utilize therefor the floating dry-dock.

The ship being light, the forward tanks were filled so as to bring her down by the head as shown on the accompanying sketch. This gave her a draft forward of 13 feet 11 inches, and aft of 13 feet 3 inches.

Across the floor of the floating dock, and at such a distance from the end that the upper corners of the sides of the dock would clear the ship's side, the ship's extreme beam being in excess of the width of the dock, was located a bulkhead, so in-

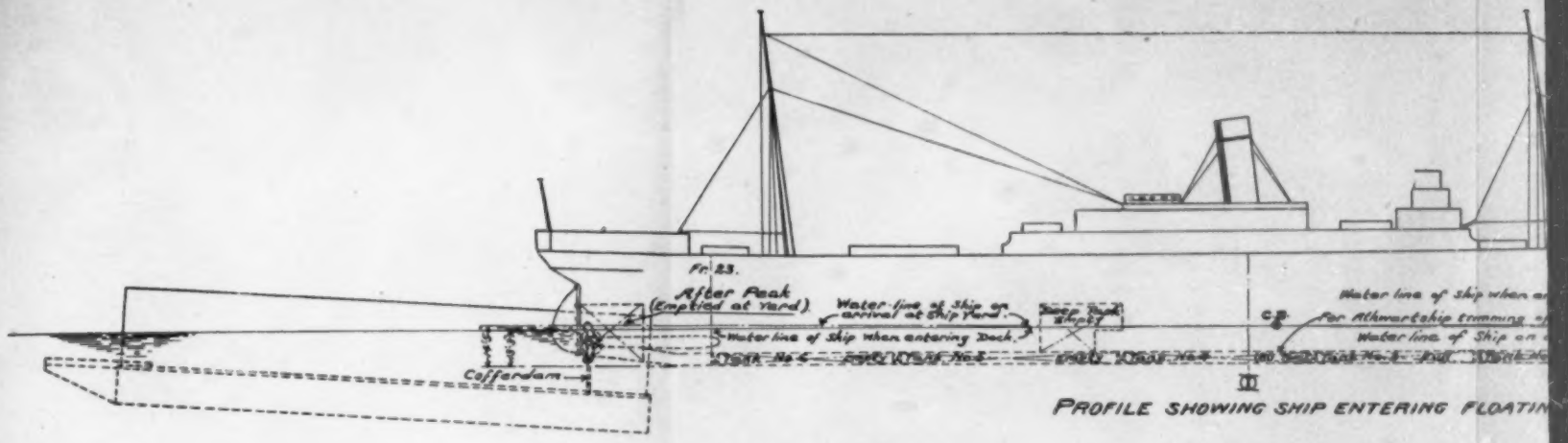
clined that when the dock was in its final inclined position this bulkhead would be practically vertical. The shape of the bulkhead was determined from the plan of the lines of the ship, the shape being taken at the section on which the bulkhead would rest.

The ship was hauled in place, her stern projecting into the sunken dock and the dock was pumped out, thus lifting until the bulkhead came in contact with the ship's bottom and sides, after which the dock lifted at one end only.

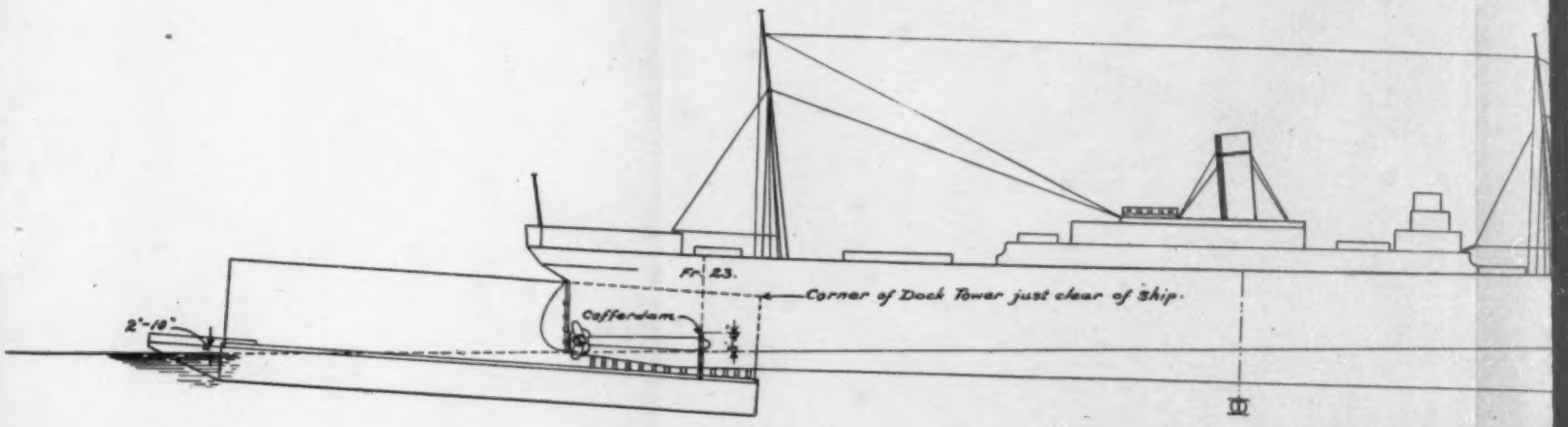
As the dock lifted against the ship, the keel blocks shown on the sketch came into play, the stern of the ship thus being lifted, which was continued until the proper position of the dock was reached; this position being such that the inclined floor of the dock and the bulkhead across the dock formed a triangular-shaped space with sides projecting above the water line sufficiently to insure safety in fairly rough weather.

After the dock had reached the desired position, the water on the floor of the dock, held in place by the inclination of the floor and the bulkhead at the end, was partly drained through the floor of the dock into the tanks below, and the remainder pumped by improvised steam pump connections.

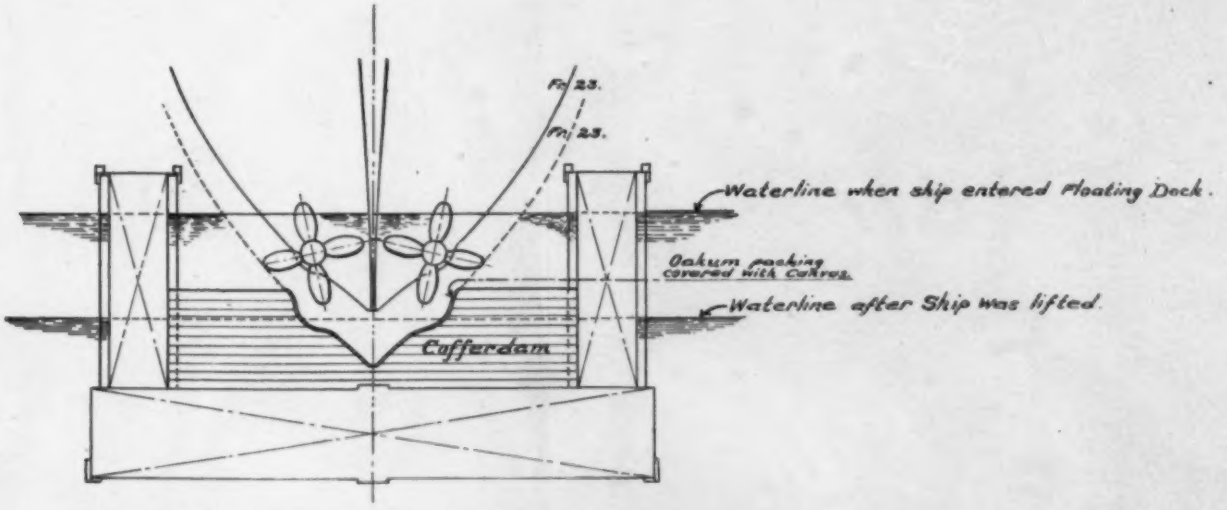
When this space was emptied of water the stern was thus supported by the keel blocks and left projecting into the improvised cofferdam, and the work of fitting the stern-post was proceeded with, satisfactorily concluded, and the floating dock removed.



PROFILE SHOWING SHIP ENTERING FLOATIN



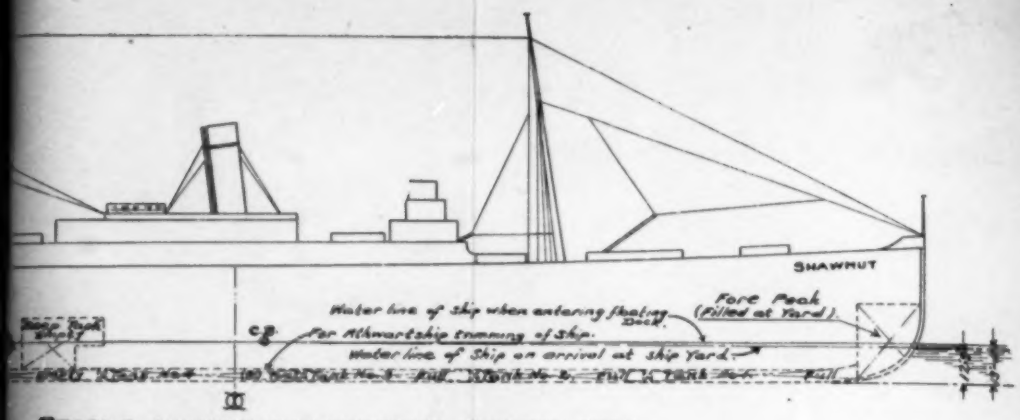
PROFILE SHOWING STERN OF SHIP LIFTED



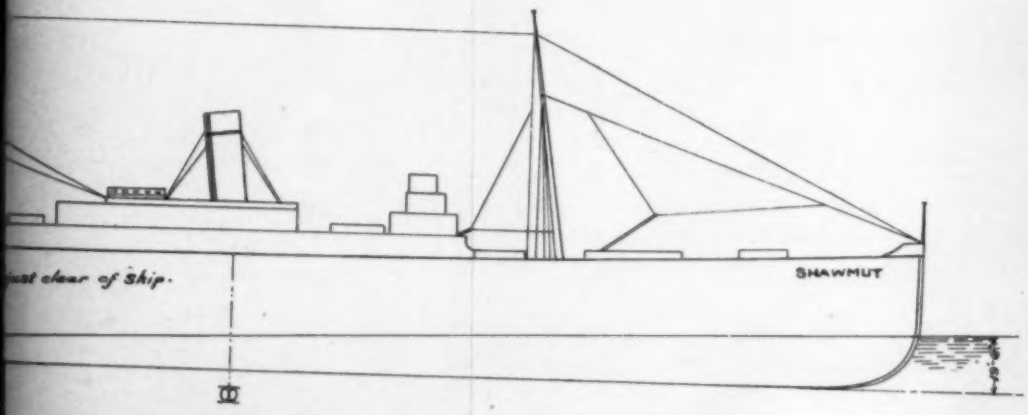
TRANSVERSE SECTION AT COFFERDAM
SHOWING STERN OF SHIP ENTERING FLOATING DOCK.

ARR

COFFÉR


SHAWMUT
Water line of ship when entering floating Dock.
Fore Peak (Filled at Yard)
C.B.
For Athwartship trimming of Ship.
Water line of Ship on arrival at ship Yard.

PROFILE SHOWING SHIP ENTERING FLOATING DOCK.



PROFILE SHOWING STERN OF SHIP LIFTED BY FLOATING DOCK.

ship entered Floating Dock.

Ship was lifted.

S. S. SHAWMUT

ARRANGEMENT OF FLOATING DOCK AND COFFERDAM FOR REPAIRING STERN.

SCALE $\frac{1}{16}$" AND $\frac{1}{40}$" = 1FT

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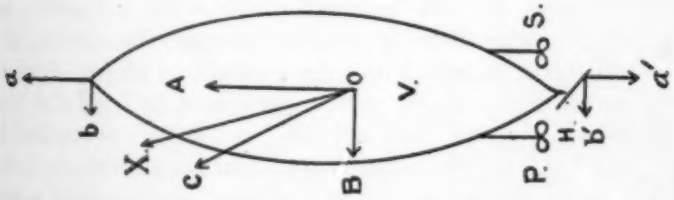
U. S. NAVAL INSTITUTE, ANNAPOLIS, MD.

A CORRECTION TO BE APPLIED TO THE COURSE OF A TWIN-SCREW VESSEL WHEN USING BUT ONE SCREW.

By Ensign Robert Henderson, U. S. Navy.

1. Occasionally it happens that a twin-screw vessel can use but one screw for hours, or even days, at a time, the other screw being out of use owing to accident or other circumstance. Under this condition, it may seem at first thought that the turning effect due to the use of one screw is exactly compensated by carrying a permanent helm in the direction of the idle screw and that, consequently, the vessel moves ahead in the same direction as though both screws were in use. The turning effort of the one screw is compensated by the rudder, but the vessel does not move along the course indicated by the compass or in the direction of the fore and aft line of the vessel. This error in the course, small as it may be, should be borne in mind, and the error for each type of vessel should be determined.



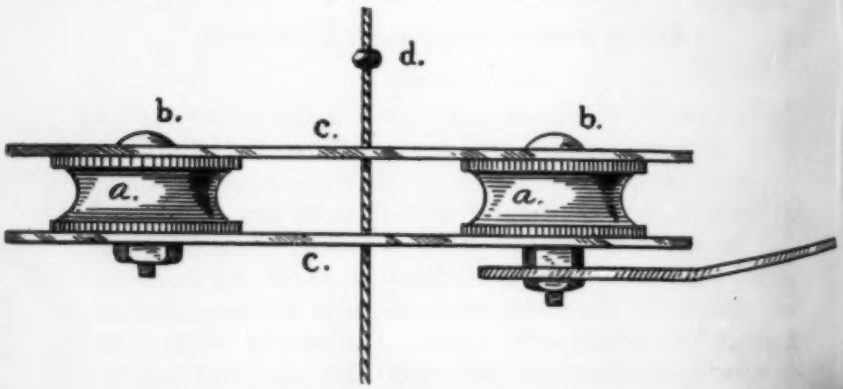
2. Referring to the sketch where the various forces are shown graphically:

"V." Vessel propelled by starboard screw "S."

"H." Port helm to compensate for the turning tendency of the one screw "S," the port screw being idle. Under the influence of starboard screw and port helm, the vessel moves in a

straight line and apparently ahead along the course indicated by the compass.

3. Resolving the force of "S" along axes parallel to the fore and aft line and athwartship line, we find that the principal component is along the fore and aft line, tending to drive the vessel ahead, shown at the bow as "a," while a smaller component is along the athwartship line tending to turn the bow to port, shown as "b." This may be readily understood from the fact that a vessel with an amidship helm and starboard screw going ahead would turn in a circle to port.



4. Resolving the forces brought into action by the port helm, we find that one component is astern tending to stop the vessel, shown as "a'," while the other component is athwartship tending to push the stern to port, shown as "b'."

5. Combining the four resultants of the screw and rudder, we find that one large force is ahead, one small force astern, and two small forces to port, hence the resultant of all four forces is ahead and *to port*. In the sketch, the forces "a" and "a'" are combined as "A," and "b" and "b'" as "B." The resultant of "A" and "B" is "C," which is the course on which the vessel tends to move, but owing to greater or less "center-board" action, depending upon the type of vessel, the true course is not along "O C" but somewhere between "O C" and "O A," possibly "O X." Whatever this true course may be, the compass will at the same time indicate a course along "O A."

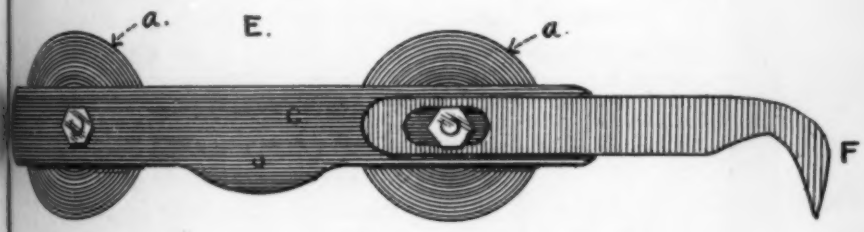
6. The angle between the component "O A" and "O X" is the single screw correction and should be known. This error

will vary in the different types of vessels. In destroyers and other fine-lined high-speed vessels, this correction might be inappreciable, owing to the short distance between the screw and the fore and aft line; also to the "center-board" action of a long, narrow, deep hull, causing the vessel to slide nearly in the direction of the keel. In battleships, monitors, and auxiliaries, the single screw correction would become appreciable and might be large enough to become a factor in navigation.

7. A simple method of determining this correction is suggested as follows:

8. When the sounding machine lead is trailed in a smooth, calm sea, the wire will tend exactly astern. While turning, or if for any reason the vessel has leeway, the wire will tend in the true wake and in a direction opposite to the true course. This principle may be used in determining the single screw correction.

9. The experiment may be determined from either gangway grating, the principle follows just the same, and the absence of vibration and other circumstances make it easier to conduct the observation there than from away aft.



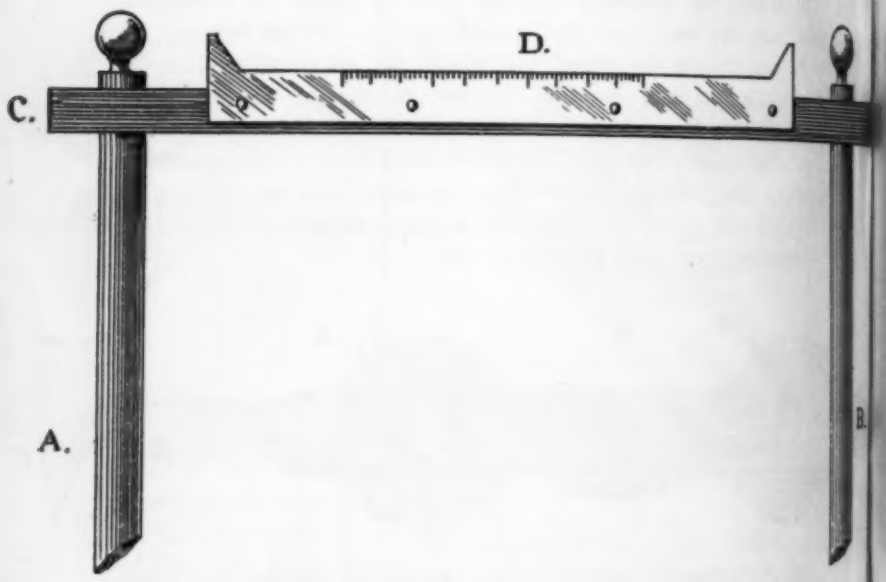
10. Referring to sketch: "A" and "B" are the two gangway stanchions which ordinarily support the gangway rails. In place of the gangway rails put on the athwartship piece of wood "C," about 1½" by 2½". On the forward side of this cross piece bolt a ¼" or ⅜" iron plate, "D," extending the full length of and projecting about one inch above "C."

11. The upper edge of this plate is rounded so as to form a track. Mark the forward edge of this plate in inches and tenths of inches for about six inches, both sides of the middle.

12. A carrier, "E," is made with two small grooved wheels to fit upon the track, "D." This carrier consists of two wheels in tandem, free to revolve upon bolts, "b" "b," and held apart by

side pieces, " c " " c." In the center of " c " and " c," and below the line of axles, are drilled two holes large enough to allow the sounding wire to pass freely. On the same bolt with one of the wheels, and held in place by the nut and an extra joint nut, is an arm and pointer, " F "; this arm has a slot an inch long to permit of adjustment before setting upon the jamb nut.

13. Adjust the apparatus as follows: Unwind about fifty fathoms of sounding wire from the sounding machine and make the fifty-fathom mark fast to a point directly forward of the cross-piece " C " and level with it. Reeve the end through the carrier,



" E," bend on the lead and let it drag astern. After the wire is taut, then place the carrier on the track; it will be held in place by the downward pressure of the wire. Just abaft the carrier pass several turns of seizing, as at " d." This is to prevent delay in recovering the carrier should it jump the track and slide down the wire.

14. With the vessel going ahead at any prescribed speed with both screws, adjust the pointer, " F," so that it points to any whole inch mark, then set up on the jamb nut, at the same time binding slightly the wheels " a " " a " so that they may not follow the vibrations of the wire but are free to follow any per-

ceptible change in direction. To set the pointer "F" exactly on a whole inch mark, a signal should be arranged with the bridge. The quartermaster should be directed to ring a bell whenever the ship is on her course, this bell to be rung during the entire experiment whenever the ship is exactly on her course. The point on which the pointer "F" is set becomes the "zero" point and should be marked with chalk.

15. Next, stop one engine and caution the quartermaster to steer the same course as before, ringing the bell whenever the lubbers mark is exactly on the course previously steered; this to continue for ten minutes. The sounding lead will follow in the true wake and the wire will no longer tend over the zero mark. The deviation of the wire from the zero mark is to be read whenever the bell rings and the mean of these readings will give in inches the deviation for that speed. Knowing the distance from the zero mark to the point where the wire is made fast, the correction in inches may easily be changed to degrees. This correction in degrees will be the correction to be applied to the true compass reading to obtain the true course.

16. Possibly this correction may vary perceptibly with the speed: if so, a series of observations should be taken at various speeds and a curve plotted, the curve to be checked up by a set of similar observations with the opposite screw and an opposite helm angle.

Simultaneous readings of the helm angle should be taken with the reading of the screw error.

A bag of sand could be substituted for the regular lead: this would insure the wire against dragging below the draft of the ship at the slower speeds into possible under-currents.

The retarding effect of the rudder and of the idle screw are unimportant factors and need not be considered.

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ADDENDUM TO "OPERATIONS OF THE NAVY AND MARINE CORPS IN THE PHILIPPINE ARCHIPELAGO, 1898-1902. (No. 112.)"

By COMMANDER E. B. BARRY, U. S. Navy.

1901.

May 29. A combined expedition with Brig.-General Kobbe, consisting of the Vicksburg and Calamianes with the army transport Æolus, captured Puerta Princessa, the capital of the island of Paragua, after a show of resistance.

June 2. Received the surrender of Kulion.

June 5. Visited the west coast of Paragua attempting to capture Sandoval, the last of the Aguinaldo adherents in that island. Some days before his band fired at the Calamianes in Matiaguit, but they were dispersed with some loss by the Calamianes. Sandoval was pursued among the mountains of Paragua by an army force, under Major Brown, and died of sickness during the chase.

At Kulion the Calamianes captured six of Sandoval's men endeavoring to make their way to Cuyo.

June 7. Received the loyal protestations of the inhabitants of Cuyo.

October 25. Assisted landing marines and stores at Vasey, and same day relieved army force at Bilanziza in company with U. S. S. Frolic and Zafiro. Shelled an insurgent earthwork above Bilanziza and caused its abandonment with a reported loss of three men.

October 29. Destroyed villages of Marikani and Gizose.

October 30. Destroyed village of Laknan.

November 6. Joint expedition consisting of detachment from crew of Vicksburg and marines from Vasey ascended Sohoton (Lieut.-Comdr. Glennon in command), and after a smart engagement destroyed some fortifications and returned with a loss of two marines killed; about seventy of the natives were killed or wounded.

During late October and the early part of November the Vicksburg was actively employed visiting army posts on the coast of Samar and destroying villages, boats, and provisions of insurgents. A joint operation had been devised with Brig.-General Smith for the capture of Luckban, the leader of the insurrection in Samar, but the Vicksburg was ordered by cable to Newchwang, China, and the attempt was rendered useless.

DISCUSSION.

AMERICAN NAVAL POLICY. Prize Essay. (See No. 113.)

Captain J. C. WILSON, U. S. Navy.—The "Essay" on "American Naval Policy" by Commander Fiske covers a large field, and in so doing the writer could not treat any one subject exhaustively in the space at his disposal; but he has selected vital points and discussed them sufficiently to show pretty conclusively that the service has much to do and even more to undo, as regards the conclusions mentioned in the opening note to the essay. It is no new idea in the service that our navy of fine modern ships has been constructed without any regard to a policy or program. This has not been the fault of naval officers, but the fault of the method of administration in the Navy Department, which has gone along in a hap-hazard way practically without direction until of late years, when the General Board has exercised a supervision, and a most beneficial influence over the administration. But the constitution and powers of this General Board are not now sufficient to make them a responsible "Board of Directors," and until this is remedied we may expect but little improvement in results, despite such able essays as the one under discussion. Bureau officers have neither the time nor information requisite to study out and formulate a naval policy, either of building, or administration, nor has the Secretary of the Navy the requisite technical knowledge, or time to spare from his more legitimate duties to do this work, and there remains nobody but the General Board to do it.

While all officers are eager and willing to give their best services to the government, the conditions under which such services are given should be such as to obtain the best results.

A commanding officer can carry on his duties successfully only by virtue of the laws and regulations which have been carefully framed to give him all the authority and prestige necessary for his position.

A Board of Directors (General Staff) in the Navy Department should exist by virtue of a law of Congress, and their duties defined so that while subject to the approval of the Secretary, their recommendations would have weight with the Secretary and Congress. Such a body to be effective must be more than a "Board" ordered by the Secretary of the Navy for his convenience. It must have the power of the government behind it, as when performing its proper duties it will be the most important "Bureau" of the Department, and without it the administration of the Department will never get beyond its hap-hazard, unsystematic methods of so-called progress.

In a recent discussion of an "essay" by Rear-Admiral Luce, entitled "The Department of the Navy," I have given my views on this question at such a length that it is unnecessary to dwell longer on this subject, excepting to say that while I have stated that the "General Staff of the Navy" should be incorporated for advisory duties only, I advocate this because of the opposition to the incorporation of such a body for any purpose whatever, and not because I believe that such a body should not

have as much authority in its duties as a Chief of Bureau has in his. Without touching upon what should be the proper strength of our navy, I wish to emphasize the essayist's statement concerning large battleships and the homogeneity of ships in fleets and squadrons. I think he has made it clear that the larger heavy battleship has preponderence of advantages over the smaller and so-called handier one; and I believe that the size of our battleships should only be limited by the depth of the channels leading to our principal naval stations.

Another very important point is the construction of vessels of a homogeneous type, so that battery power, speed, maneuvering qualities, ability to stand hard knocks, etc., of vessels in the same group should be about the same. All vessels not intended for special purposes should be built in groups of four. Assuming that the navy should be increased annually by two battleships, two scouts, and two torpedo vessels, besides auxiliaries, four of each of these class of vessels should be laid down every two years. This would simplify designing, greatly cheapen and distribute the work of construction, and lessen the time of building, as well as give designers time to catch up with advanced improvements before a new group was designed. Any changes made in a vessel under construction would be made in the whole group, and absolutely homogeneous vessels would be turned out at the same time, to go into commission together and make one squadron or division of a fleet.

The question of the composition of a fleet for fighting purposes has been very imperfectly worked out. As the essayist remarks, "Battleships, armored cruisers, torpedo-boats, scouts, etc., have been constructed because other nations were building such crafts, without any policy as to the needs of our own government as distinct from that of other nations."

I can see no place in the fighting line for "armored cruisers," and if they cannot keep in the fighting line, what service can they perform in time of war or peace that cannot be done by a much smaller, cheaper, and more serviceable vessel? The armored cruiser has no place in our service to-day, and it is a great pity that the time and money spent in them had not been spent on battleships. The only thing now is to build no more of them. What we want is a fighting fleet with the auxiliaries. And it should be easy to say now of which type of ships a fleet should consist. It should consist of battleships, torpedo vessels, and scouts, with such auxiliaries as colliers, ammunition, supply, cable, repair, and hospital ships as may be necessary. Armored cruisers, protected cruisers, gunboats, etc., should be dropped from all consideration as fighting ships and used for cruising and auxiliary purposes only.

Torpedo vessels should be large enough to keep the sea at all times and for long periods of time. Their tonage should be increased in order that their sea-going qualities, coal endurance, carrying capacity, and comfort to officers and crew might be increased. The ideal torpedo vessel and the "scout" class approach very close to each other, and it is a question whether a design could not be adopted which would answer for both.

The essayist's idea about keeping the fleets near a home base, going out for drills and in for frequent overhaulings, seem to meet the requirements

better than the plan now in operation of cruising about for months and then laying up for repairs for several months. Practically all the time of the fighting fleet should be taken up in drills and torpedo work. There would necessarily be time enough between for rest and recreation.

The question of the position of the admiral of a fleet and the kind of ship he should be in, is an important one and opens up a question which requires much consideration. The arguments brought forth by the essayist for placing him in a smaller vessel outside the fighting line are very strong and I am much inclined to agree with him; and here if anywhere would be a place for an armored cruiser. She has speed, and considerable power of offense and defense, all of which would seem to be requisite qualities for the flagship of a commander-in-chief.

In a short discussion it is impracticable to touch upon all the points so clearly discussed by the essayist. I have only touched upon a few of the important ones, though I consider the essay as a whole a most valuable addition from every point of view to the naval literature of our country, and I hope it may be productive of practical results, and improvements in the methods of the administration of our navy both ashore and afloat.

Lieut.-Comdr. A. P. NIBLACK, U. S. Navy.—The motto of the essay suggests the thought: What if you are not right and then go ahead? That seems to me to be a good deal like what has happened in this case. The essayist states three "important conclusions" as the basis of his argument. I should have stated them quite differently:

(1) The ships of our battle fleet *are* correctly designed from a military standpoint, but some of them need to be changed as to gun protection and ammunition supply.

(2) The art and science of naval tactics *are* being developed by the Naval War College but not by the fleet.

(3) The administration of the navy needs some sort of a general staff arrangement to handle details.

The difference in the statements is largely that between destructive criticism and construction. The essayist takes a fall out of everybody and everything, and on page 79, just in sight of an exhausting finish, declares that "To formulate a policy that will be the best, will clearly need the closest study, the most original suggestions, the most careful thought, and the most logical decision of a special body of officers." This is as much as to say that he gives it up as to the American Naval Policy. The "most original suggestions" are plentiful in the essay but I find that the "most logical decision" is not always forthcoming.

Let us follow up some of the reasoning. The first eight pages of "General Principles" is summed up in the sentence, "Therefore, in order to whip, in order to be strong enough to go to war, our navy must be stronger at the start than the navy of the enemy." Not at all, my dear Fiske. In order to win, it must merely be stronger at the *end* of the war. Strategy and tactics arrange this. Page 10: "We need a navy even larger than Great Britain's, because our policy is more provocative of war than hers, especially with monarchies." We can never get such a navy, and are

lucky to get what we have. If "American Naval Policy" depends on such general principles, then the "Folly of Ineffectual Resistance" will be our fate, and we had better accept it,—and eat, drink, and be merry.

As to "The Battle Fleet." On page 24 we find: "A consideration of these tables has brought out very clearly to the writer's mind the fact that, in every fighting ship the thing *most* to be desired is a maximum offensive power and a minimum of liability to having this offensive power destroyed." Certainly our ships, of all others, have the maximum of offensive power, now that we have taken up underwater discharge for torpedoes, but it is true that there are serious doubts in many minds as to the protection to guns and ammunition supply in some of our ships, but why on page 14 does the essayist say: "We may take it as a principle, then, that the *first* quality in our fleet to be demanded in a fleet fight will be *speed*." If you emphasize offensive power, you can proceed about your business, and let the enemy use his superior speed to hover around the horizon and screw up his courage. Speed is desirable but it does not come first and offensive power does. The essayist says "manageability" is the second quality. Now with draught of water in our ships restricted to 27 feet, quick handling cannot be had, as compared with ships in which there is no restriction in this respect. Restricted draught must, therefore, be wrong policy, for on page 36 it is stated that, "We should make our battleships as large as the state of the engineering arts permits." The fact is, of course, that all the questions of ship's qualities are questions of compromises, and no two people agree on these.

The tables are admirable, original, and valuable, and if the essayist had merely published these he would have rendered conspicuous service. The reasoning as to big guns is in line with the most advanced thought, and the "Protection of the Directing Personnel" is sound. In the prize essay of 1896 it was held that "Protecting shields and armored fighting stations at several points should be provided for the admiral, the captain, the signalmen, and the immediate officers liable to succeed to the command, in case of accident to the commanding officer." It was also stated that, "The flagship in a large fleet should be an armored cruiser of considerable speed. Her position need not be in the line of battle except when it is to her advantage . . . that others may easily see the admiral's signals and to enable him to see as much of the action as possible." This is practically the position taken by the essayist. He also emphasizes another statement in the prize essay of 1896, viz.: "The highest development of the scout would therefore be the improved St. Louis merchant type of high speed, great coal capacity, and armored and coal protection to boilers and engines." The essayist's comments on scouting are excellent.

The discussion of naval tactics shows that the essayist is pretty well in accord with prevailing ideas, except in the statement that *our* ships "do not have much fire ahead." Excepting in the Alabama and Maine classes, that is just what they have in a marked degree. If there are any battleships in the world with their "ahead fire" superior to the New Jersey class and subsequent ships, or to the Oregon, Massachusetts, Indiana, and Iowa, their plans are secret. Seven reasons are given in the essay for the

present undeveloped state of naval tactics. Part of the sixth reason is stated: "The changes in ships and mechanisms have been so rapid and tremendous that officers, especially of flag rank, and command rank, whose professional education was almost wholly confined to sails and spars, have had all they could do to learn to manage the ships and their mechanisms, and have had to leave the larger, but less urgent, questions of naval tactics to those who should come after." I am very glad that the class I graduated in is just about on the fence between the "has beens" and the coming giants, otherwise I should regard the statement as being about the blackest eye ever given the long-suffering naval personnel. As it is I shall feel encouraged to study naval tactics.

Just one more comment and I am through. The third reason, given on page 73, for our navy being so slow in taking up new inventions, is as follows: "(3) The fact that, saving the case of deeds of extraordinary heroism in life-saving, the special rewards given by the Department to officers have been given only in war. The wisdom of giving special rewards in war is evident. But almost all the officers who have ever been in the American Navy have gone through their entire careers without seeing any war. Therefore, our system has so arranged matters that nearly every officer who has ever been in the navy has gone through his entire career without that special and powerful stimulus which the hope of reward unfailingly gives, and which most men urgently need." Therefore, if this means anything, our system should so arrange matters that we should have a war now and then as a stimulus. Let us analyze this paragraph in detail. There are four sentences. The first sentence is not true because the Department is continually and specially rewarding good officers by giving them important commands and details. The second sentence implies that we have a wise system of giving special rewards in war, whereas I personally think that our system in that respect is open to just criticism. The third sentence is the exact reverse of the truth because, prior to the Japanese-Russian war, in no navy in the world have the officers had as much war experience as ours have. The fourth sentence hints at selection or some other powerful stimulus which the hope of reward holds out. I am pleased to go on record as opposed to any other form of selection than that which we now have. Officers are selected every day for their fitness for certain desirable billets, and in war the highest form of selection is legalized by existing statutes. It is a pretty poor officer that gets discouraged on slow promotion, or allows himself to go to seed.

Commander E. B. BARRY, U. S. Navy. It was with mingled feelings of pride and sorrow that I read the first part of Commander Fiske's essay on American Naval Policy. Pride that so logical a deduction is made from known truths; but sorrow that it has had a naval officer for its author.

This essay will fall on deaf ears; it will not affect, in the slightest degree, the workings of what may well be called our historical policy.

The average American with a legal fight to settle usually employs a

lawyer and accepts his advice as that of an expert; so also the American when he gets sick calls in his doctor for the same reason; but the naval officer knows nothing of his profession; how can he when he thinks only of war and slaughter and how he can deplete the public purse? Alas, poor Charles of England, your ghost yet stalks through this land!

If Commander Fiske had sent the first part of this essay to Silas P. Corntossel of Podunk, a gentleman noted throughout the land for turning the straightest furrow, and although "nigh onto seventy year" he never had been outside the village limits. If the good old man had published it under his own name, there is no knowing what good might have come from it. At least, it would have been granted a hearing and an attention that will not now be granted it. Surely it is unfortunate and pregnant with possible future disaster that this condition exists. President Cleveland once said we are confronted with a condition and not a theory. The only hope that such essays will not fall entirely upon deaf ears lies among the few men of national minds whose horizon is not limited by the village, the county, the state, or the party.

I think the general principles governing navies, their purpose and strength as deduced, cannot be controverted. The importance of a proper signal system is brought clearly before the mind, while the value of offensive power as set forth in the tables and in their explanations presents certain facts in a way that even the dullest can understand.

I am glad to see how easily the author disposes of the "volume of fire school," a fad not long ago among certain so-called artillerists. The ideas of offensive and defensive power are along the lines laid down by Lieut.-Comdr. Poundstone and shown in the armor and battery arrangement of battleships designed by him and submitted to the Department. From the essayist's close reasoning along these lines there seems to be no escape. Equally true seem to me his remarks on large ships and small ships. This recalls to mind a famous debate that took place since 1865 over a question of additional tonnage to be allowed the navy. A gentleman, who must have been an expert because he was not a naval officer, said he could see no reason for building vessels even as large as one thousand tons, armed with numbers of guns; what the United States needed was ten or twelve vessels, each of one hundred tons and each armed with one one-hundred ton gun! Shades of Jefferson's gunboats; hide yourselves in shame! Although at school every midshipman knew what nonsense this was.

What difference does it make in her fighting qualities if a certain battleship be too large to enter a certain harbor? Unless that harbor possesses strategic value it would be a crime against the nation to build battleships of inferior offensive and defensive power, disregarding naval considerations because forsooth the larger ships could not be built there or could not go there. Thanks to sound strategical teaching, it is becoming known that the defense of a coast is not in its harbors but outside of them.

As for homogeneity and progress, there is in the author's remarks much to be remembered. Since the beginning of our modern navy, in spite of all that has been written and preached, it would seem as though the effort

always had been made to make each appropriation group of fleet ships as different in battle essentials as possible from all other groups of fleet ships. Hence homogeneity always seemed wanting, for a unit group cannot consist of less than four, properly of eight. This carries back to the author's note at the beginning of the essay to which I shall refer later.

The remarks on scouts are apt and timely; personally I am opposed to man-of-war scouts unless they are armored cruisers. A scout's duty is to find out something; some movement of the enemy, the composition and strength of his fleet, its speed, etc. To accomplish this the scout must have both offensive and defensive power, since, naturally, the enemy will try to screen his movements. How will a 3000-ton torpedo-boat avoid destruction except by keeping out of the enemy's range? What can she find out if she cannot penetrate the outer screen; By all means let us have fast vessels that carry little else than motive power and fuel to run errands and to convey the information their big sisters have won.

Turning now to the second part and entering what may be called the field of speculation and politics, I must confess to a feeling of disappointment. To me the first bright promise is not fulfilled.

Under naval tactics, if I understand the author correctly, he has confused the relations of the "longest lines." If a fleet will have the advantage of position when its longest line is nearest to being perpendicular to the direction of the middle of the other fleet; then a fleet in column heading north, whose line prolonged passes through the center of a fleet in line east and west heading south, will have the advantage of position when it is well known the opposite is the case and the second fleet has attained the position now awkwardly designated a "capping." Later, this again is referred to, but neither exposition seems clear. I should be loath to see the old term "line of bearing" die out.

The reasons why the "fighting admiral" should be done away with seem clear. The modern admiral should be posted in his special flagship reasonably removed from the fighting line after the engagement begins and able to direct operations. The historical growth of the two positions of commanding general and commanding admiral during battle would be curious were it not true. The very reasons that separated the general more and more from the fighting line as the necessity to direct became greater seem to have forced the admiral into a sort of "post of honor," the head of the line where the enemy would be sure to concentrate his greatest efforts at destruction. In other words, on the water the directing fore was exposed to the earliest destruction. While this might answer in the "good old sailing days" it is a method to-day best adapted to produce in the shortest possible time the destruction, or at least the defeat, of the fighting admiral's fleet.

I must disagree, however, with many of the author's reasons for the undeveloped state of naval tactics. I much doubt if the changes of conditions of warfare have been greater on the water than on the land. If by weapons the author means guns and their projectiles, these have advanced side by side afloat and ashore; if he means facility of transportation or translation, steam and electricity again have developed side by side.

Before the sail period we had the oar period, the precursor of steam and steam tactics. It is always well not to hide your light under a bushel, but it is not always best to blow your own horn. I doubt if many will agree with the essayist that, as contrasted with navy officers, the mental work required of army officers in the exercise of their ordinary duties is so vastly inferior to that required of navy officers.

As for interest in naval tactics, I doubt if any navy officer can go through a tour of duty at the War College and not develop some interest in naval tactics. Incidentally, I would remark that it was the War College that developed Captain Mahan.

It ill becomes an officer to charge the navy with any responsibility for the shameful conditions existing during the period just after the close of the Civil War. That these conditions do not exist to-day is due more to the struggles and efforts of officers than to the help of so-called friends of the navy.

From a purely professional point of view the greatest calamity that ever befell our navy was the Civil War. What the navy had done was not recognized. That it had developed only to meet peculiar conditions largely non-naval, was not recognized. That it had not been opposed to a navy, or on the water to forces approaching equality, was not recognized. Finally, that the army could not have accomplished what it did without the aid of the navy was not recognized. When you add to this the "spread eagle" buncombe of the "whip creation" type that exclaimed so often one had but to stamp his foot (presumably on United States soil) and a million men would spring to arms! It was thought that the same method would create a navy.

After peace was made the war with Spain was a God send to the navy, lifting it to the crest of a wave of popularity which has given it already half the battleship force required to assure the strong man armed that he keepeth his court in peace.

I confess I can see no connection in the reasoning that because obsolete types of ships and guns are no longer used we have broken away from "traditions of the service." Did we break away from the traditions of the service when we first used horizontal fire with spherical fuzed shell, when we substituted locks for loggerheads? I fear the New School does not always consult history.

"Old times" surely will resent the author's reasons for the existence of an improved morale. One would infer that in the indefinite past nobody ever wanted to do his duty or even tried to do it, that there never was any pride taken in ships or guns, and that all the wonderful changes in ships, guns, gunnery, and "morale" were brought about by "Sims." I think, perhaps, it would be well if the essayist had enlightened us how the "new navy" came into being. If, as the essayist states, it was begun in 1881, and a "Sims" was graduated in 1882, what forces were at work at that time lifting the navy out of the slough? Who were the "we" that "had a hard time to breathe into its nostrils the breath of life"?

Granting a battle fleet is formed approaching as near homogeneity as our various and varied vessels will permit, it seems as though the proposed

method of evolving a system of naval tactics is a good one. What we need most urgently is the separation of the battle fleet from the peace fleet and to keep the separation complete. If there be any so-called cruisers and transports in home waters keep them away from the fighting ships—follow the essayist's scheme of organization for strong navy and weak navy.

It goes without saying that we want a well drilled commander-in-chief, but we should guard against the specious reasoning by which the exception is substituted for the general. It is possible for a worthless division or squadron commander or a worthless captain to be a perfect commander-in-chief, so also is it possible for the admirable captain to be the worthless commander-in-chief. History, however, rarely bears this out; all or nearly all the great naval and military men of history were noted for their excellence in the lower grades.

Under administration, it seems to me the essayist confuses the ships on the navy list with the ships of the battle fleet. Neither the Intrepid, the Cumberland, nor the Boxer were intended, even in the wildest flights of the most archaic "old timer's" imagination to form part either of the battle force or of the cruising force.

The reasons why the navy fails to adopt every invention the minute, so to speak, it is on the market, are based on proper conservatism. Chasing the ignis fatuus is wrong more times than it is right, and the essayist here is looking into the past with the eyes of to-day. The Yankee at King Arthur's Court has an undercurrent of philosophy strong and silent beneath the bubbling brook of its sparkling fun.

I must deprecate the wise question of the ancient and sapient sailmaker. Judging by my experience with the "old sailmaker" when I first entered the navy, I think it would have been rather difficult for one of those old gentlemen to determine what constituted "eminent men" and "master minds." Perhaps the essayist has mixed politician and naval officer. If the words "master mind" are to be taken literally, this country has produced but one master mind and its possessor was never in the army. If the essayist will separate political influence or vote-getting power from excellence in profession I think he can find a better explanation of the little influence exerted by naval officers on public life. Except the occasional "man with a pull," who usually works for himself alone, our officers seem to be trying to attend solely to their profession. Some of them are away from home and cannot build up a following or a "weight." This kind of building it is well they should not do. It will be a sad day for the navy when its officers are political factors. I think the essayist fails entirely to judge conditions in this country as they existed at the close of the Civil War. It was a volunteer's war. After the first battle of Bull Run the regular army, as such, was not heard of. Although all the great military leaders were West Pointers, many of the second grade were from civil life, so the generals, colonels, and majors went back to their former occupations, carrying their titles with them, only to become (I was about to say heroes, but heroes did not exist from B. C. 2000 to A. D. 1898) prominent, usually through their talents, but aided nevertheless by their military prestige.

Out of sight out of mind. Has the essayist failed to discover in the history of the United States the unfailing regularity with which every war was preceded by a period of naval neglect and was followed by a short-lived period of popularity and attention? The author must seek in the peculiar construction of our national mind the causes for the situation he deplores but in which many of us glory. I hope I shall never live to see the day when naval officers are searching for votes, straightening their fences, spell-binding and—neglecting their profession. What Lord Charles Beresford can do in England neither he nor any other navy officer could do in the United States. Such proceedings are fundamentally at variance with our nation's ideas.

The plea for a general staff is well made but, to me, not convincing. I think the essayist misses an essential point. The directors of a big business concern have power to direct something. Why did not the essayist tell us who directs the navy. If he can organize any government service in this country on a business basis he can do more than ever was done, or ever will be done. Our people do not want it, never did, and never will. All government service is looked upon as a thing apart, and particular care is taken to see that any particular branch is not conducted in the same way as a corresponding industry in commercial life.

Efforts unceasing have been made to establish some sort of naval policy; it has been shown over and over again that we waste thousands, nay, millions of dollars for want of some faint symptoms of consistent policy; but every effort has failed and they will fail—until after the next war.

Perhaps then naval officers will be listened to for a very little while, longer than in the past, and they may succeed in having established a naval policy—not a political naval policy as might be inferred from some of the essayist's remarks, but a consistent, thought-out policy of construction—number, size, armament, personnel, and strategic distribution.

With these it is the function of naval officers to deal.

Lieutenant T. S. WILSON, U. S. Navy.—In "American Naval Policy" the essayist gives so many excellent reasons why our battleships should be built on the "all turret plan" that there seems to be nothing more to be said on the subject.

Everyone who has been on board a battleship when a number of guns have been firing has seen how much the turret guns in ships of the Alabama type interfere with the broadside battery. In this type the forward pair of 6-inch guns are almost useless for any really efficient work, while the forward 13-inch guns are firing abeam or abaft the beam, and the after pair of 6-inch guns are the same on account of the after turret while the four 6-inch guns on the upper deck are not very much better. Not only does the smoke interfere but the blast of a heavy gun coming into a broadside gun port is enough to seriously handicap the pointer and trainer as well as all the other men about the gun. In an arrangement of turrets such as we have on the Indiana class practically no inconvenience is felt in the 8-inch turrets with the 13-inch turrets firing in any direction.

I agree most heartily with the essayist in limiting the guns on battle-

ships to two calibers, 12-inch and 3-inch, and it seems to me that the best place for a 3-inch gun's crew in battle would be below the protective deck. The secondary guns' crews should be relief crews for the turrets and handling room crews and should be trained as such.

The plugman of a 13-inch gun can open and close the breech from five to six times at top speed and then he begins to slow down. If a rammer or lift man gets sick his relief, a green man, drags down the time of loading from 15 to 20 seconds and the turret officer is in luck if nothing is broken, because in a properly trained crew each man is part of a machine and does his part mechanically, and every man should have an understudy.

Lieutenant EDWARD MCCAULEY, JR., U. S. Navy.—Commander Fiske's essay is so thorough and exhaustive; it shows such a large and worthwhile employment of time, thought, and study; the principles, reasoning, and conclusions are of such great importance and so evident, that there is little or no room for criticism. He has covered his subjects very fully and, without careful and painstaking searching, there is left little opportunity for discussion. One has simply to agree and approve, and to congratulate the essayist on such a splendid and complete paper.

In speaking of the proper size of our fleet, he says that "there is not a single reason to give, or to imagine, why the American people should not go through the same wars that all other nations have gone through." I can imagine but one reason, and that is, that if our naval and military power is of sufficient strength other nations will fear to go to war with us. We can only avoid some of these wars if we profit by the lessons to be learned from the histories of other and much older nations.

All authorities on naval matters, and students of naval history and tactics, seem to agree that too much accent cannot possibly be laid on the importance of high speed in our battle fleet, but if the maneuvering speed of our present fleet be compared with that of the fleet of some of our possible enemies, the comparison is not to our advantage. Nor do we know very much of what our fleet can do at the speed of which it is capable. Our fleet now exercises at tactics at a comparatively low speed. Is that speed to be used in actual battle? If not, then are we to wait until wartime to learn to maneuver in fleet formation at a higher speed? The great expenditure of coal is offered as a reason for keeping the speed at a low figure in our tactical exercises and maneuvers in peacetime. The wear and tear on the machinery and boilers and the dangers attendant on maneuvering in formations at high speeds are other reasons offered. Surely an increased expenditure of coal would be judicious. The tests to ships, machinery, boilers, and personnel, and the faults discovered and remedied would make such increased expense very reasonable. The danger of collision or accident can be somewhat avoided, by increasing the tactical distance between vessels, and maneuvering constantly at that distance until we are sufficiently expert to make it safe to resume the shorter distance and closer formations. Our ships are in most cases capable of high speed, but such speed is seldom used except for the required semi-annual trials.

Superior speed is necessary for the initiative of which the essayist writes, the use of high speed for tactical drills and maneuvers is necessary to bring out and perfect "manageability," the importance of which he emphasizes.

I am glad to see that Commander Fiske places so much importance on the great value of fast and efficient signalling. If we can but sufficiently improve our system of signalling, properly increase the ability and celerity of our signal force, and give them the facilities and necessary protection in action, the change in the "manageability" of our fleet will be as great as the change from the hand steering gear of our old sailing ships to the steam steering gear of our modern vessels, and of equal consequence.

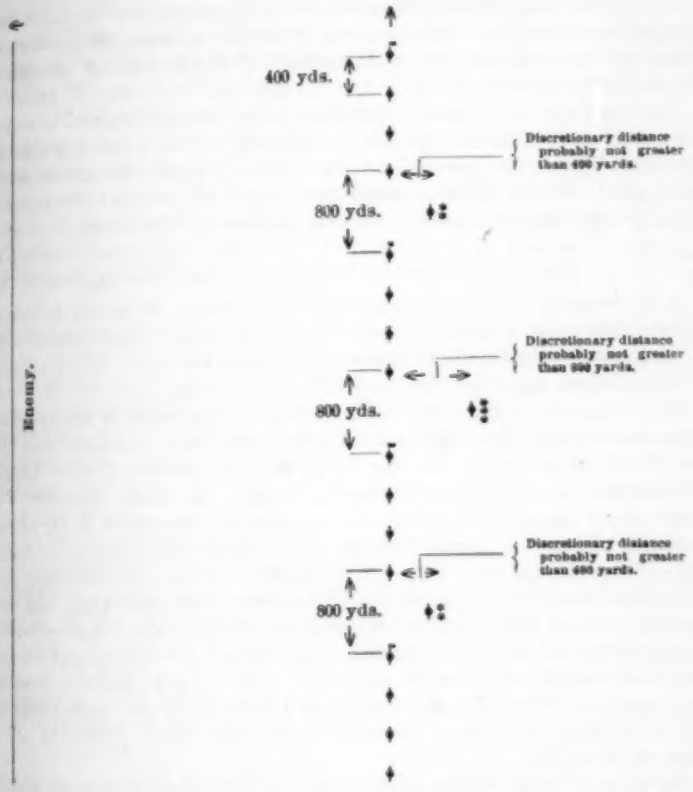
The importance of rapid and efficient signalling is one of the things which does not count in the war game as played upon a table. The interval between the time when an enemy's fleet commences a maneuver, and the time our admiral is able to decide what the enemy is about, make a signal, and commence our opposition or counter maneuver, has not, I believe, been included in any of the rules for, or in the practice of, the games. This interval will be of great importance in an actual war game played on the sea. Speed, signalling, and all else that goes to make up "manageability" will tend to lessen this interval.

If our fleet and ships are to be fought to their best advantage some "Protection of the Directing Personnel" must be invented and installed. Protection for the admiral, the captain, the signal force, and others. The use of vertical telescopes in connection with this should certainly be tried, studied, and improved upon. An "all around periscope" has been invented for submarines. Could not this be enlarged, improved upon, and adapted for use in connection with an armed tower or shield for the "Protection of the Directing Personnel"?

In regard to "Specially Designed Flagships," the disadvantages of having our flagship at the head of the line are readily seen. But it is difficult to see clearly, if she is to leeward of the line, as suggested, at one time, and then that side of the line becomes the windward or engaged side, how she is to cross through our fleet and get on the other flank without confusion. Or, if by some chance our fleet pierces the enemy's line (this may not be entirely in accord with everyone's ideas of modern tactics, but it is certainly a possible, if not probable, event), or if our fleet is engaged on both sides by the enemy, what then becomes of our flagship? Certainly it is not decided that a fleet will be engaged always on the same side throughout a battle. If our flagship is at a distance from the battle line, the enemy may maneuver to cut her off, and she may become isolated or driven away from the fleet, or perhaps captured or destroyed. If she is lightly armed, one or more of the enemy's heavy ships could be detached and sent to attack and, if possible, destroy her. It may be said that one of our heavy ships would immediately be sent to support our flagship. Even if this be done without confusion, our flagship would then be engaged in a small fight of her own, unable to maneuver with the other vessels, the admiral unable to direct his fleet.

It seems better to have our flagship one of the heaviest of the armored ships, able to take and hold her place in the fighting line whenever necessary

or desirable. Let a place be reserved for her in the line of battle always. Say between two divisions or between two squadrons. This will give her sufficient space to pass from one flank to the other to take her place in the line of battle according to necessity or desirability.


Enemy.
400 yds.
Discretionary distance probably not greater than 400 yards.
800 yds.
Discretionary distance probably not greater than 400 yards.
800 yds.
Discretionary distance probably not greater than 400 yards.
800 yds.
= Flagship of Vice-Admiral.
= Flagship of Rear-Admiral.
= Division Leader.

One has but to look at the date of publication of our Tactical Signal Book to decide that the naval battle tactics, as practiced in our fleet, have hardly kept pace with the world's naval progress. Our vessels have changed greatly in kind, number, and efficiency, and, in addition, it seems that many valuable lessons should have been learned from fleet maneuvers and even actual naval battles, since that book was published, and the actual battle tactics are but a small part of "Naval Tactics" as a whole.

I believe that there is no more instructive, no more interesting, and no more effectual way to train our officers and men, and to test and drill

our fleet and squadrons, than in sham battles—one squadron against another; if practicable, one fleet against another. From what I have seen of it, every man on board ship, from commander-in-chief down, is keenly and enthusiastically interested, and learning things which can be learned in no other way.

If Commander Fiske's scheme for forming and drilling our battle fleet should be adopted, our service would indeed be a happy, contented, interested, and most efficient one. The strength of our fleet would be increased tremendously in every way.

The naval life is not always attractive in the present day, and, as we are all human and have but one life to lead, the life on board ship must be sometimes considered apart from professional things. His scheme would go a great distance towards making the naval life the best life, as is the naval profession, in our minds, the best profession in the world.

THE DEPARTMENT OF THE NAVY. (See No. 113.)

Rear-Admiral CASPAR F. GOODRICH, U. S. Navy.—Whatever is written by Admiral Luce commands respectful attention, not alone because he is a man whom we all unite to honor, but because his views are the outcome of speculations based on rare professional knowledge.

His diagnosis of the trouble in our body politic naval is keenly drawn and quite convincing. I am not sure, however, that I can agree with him in all his prescriptions, for the latter may be influenced either by unwillingness or unconscious failure to grasp the whole situation. For example, he appears to assume that economy is a desiratum in the administration of our navy yards. To the naval officer this is indeed axiomatic, but—I lisp the question with bated breath—is it true to those who control such matters? If it were true in the eyes of our legislators, how easy to close up and abandon a lot of yards and stations which are not needed by the navy and to expend the funds thus saved in extending and improving those which are actually required! How easy to organize them on business lines! Yet Admiral Luce and I both know that these things, in all probability, will never be done for reasons which neither he nor I care to define.

As we both think that the yards should be industrial plants of the highest type, we are positive that the carrying of the bureau systems into them is detrimental and therefore inexcusable. For my part, I have already suggested officially that no bureau should be permitted to employ any workman or laborer at a yard; that a yard, under the commandant, should be organized as manufacturing establishment with a skilled and competent mechanical engineer as superintendent; that the bureaus' representatives should merely serve as planners and inspectors of work done by some one else, etc. In my letter I pointed out the fact that to-day there is practically no check upon poor or extravagant work, as each officer finds satisfactory that which he has done himself. I cannot flatter myself that my suggestions were welcome. To return to my original hint, once our legislators really demand economy, economy will be forthcoming, not one day sooner; since it may be suspected that our navy yards serve other pur-

poses besides the repairing of the fleet, and that this fact stands in the path of their betterment, notwithstanding all the discussions in the Naval Institute.

As to the necessity of giving to the General Board a status in law, we should not forget that, as Admiral Luce shows, the Secretary of the Navy executes the President's orders; also that he may depute to others as much or as little of his powers as he pleases; that under no circumstances can he (or would he) shirk the responsibility of his actions, whether individual or deputed; that the General Board, in spite of conspicuous and inconspicuous mistakes, has proved its usefulness beyond peradventure as an advisory body! and that its wisdom, inhering as it does in the excellent men who comprise it, can neither be added to nor subtracted from by any measure of law. That the legislative action recommended by Admiral Luce is necessary does not appear to many as demonstrated; that it may be desirable is another question. On these points I find myself among the doubters.

Naval Constructor T. G. ROBERTS, U. S. Navy.—It is now perhaps evident to anyone who knows as much of our naval history as the distinguished author of this paper that no reorganization of the Navy Department is possible which does not take into account all branches of the service, which does not allot to each its proper importance, and which does not permit each branch to be represented on an equal footing, if not in equal force, before the Secretary of the Navy. That much is established by sufficient proof.

The Navy Department will be reorganized one day, but it will be because of industrial considerations fresh from the industrial shops on shore. The Navy Department is the only department of the great government of ours which is engaged in spending millions of dollars in civil industry under its own management. The flaws in naval administration have been definitely located in the navy yards. The Navy Department has always been dominated by naval officers, and its policy, as a continuous performance, has been determined by the navy itself—far more so than in any other department of the government; and we have thus arrived at where we are to-day. Industrial administration has been sliced and piece-mealed to suit the purposes of those inside the Navy Department, and its glaring defects are the most visible reasons for reform.

Admiral Luce has found the point—the multiplication of independent shipyards within a navy yard. That is the whole question—consolidation.

We have this much proved: Cause—several independent shipyards within a navy yard, red tape within red tape, wheels within wheels; remedy: "consolidation" (board of 1883-84). That is to say, segregation and consolidation; the shipyard to become a single industrial unit, separated from the military units.

Now what remedy does the author reach. "Legalize the General Board." What kind of consolidation would you call that? The jump is so broad that I fail to make the connection.

Another thought deserves attention at this point. We are greatly in-

debted to the author for publishing the report of the board of 1883-4 relating to navy yard industry, and I wish to call special attention to it. It shows that the conditions "about twenty years ago" were exactly the same as now. The date of that board places it near the end of the administration of President Arthur. Now what was the effect of that great exposure of navy yard methods? Admiral Luce tells us on page 85 that, in November, 1885, the date of Secretary Whitney, the "purchases of the several bureaus were placed under the Paymaster General." That was the first consolidation that I have ever heard about—consolidation of the *power to purchase* from all bureaus to a single one. I happen to know that this was not all that was done towards the consolidation recommended by the board. A year later, on December 4, 1886, Secretary Whitney issued an order creating a general storehouse in each navy yard, and this consolidated the *stores and supplies* from all departments to the one. This was done also without legislation, but within the Secretary's administrative authority. There consolidation ended, a drop in the bucket. Such were the results of that navy yard exposure.

We hear nothing more of consolidation until near the close of a recent Secretary's administration, three or four years ago. He, from his own observation, determined that some consolidation was desirable, and besides mentioning it in his reports, he issued an order consolidating the electric lighting throughout navy yards from all departments to the one. That much consolidation we got as the result of another Secretary's accumulated convictions.

Shortly after that, about two years ago, when the labor unions invaded Congress and secured the building of the Connecticut in a navy yard, there was another exposure of the same old navy yard methods, the result of which was to prove what was known before. Incidentally congressmen noticed navy yards, and seeing several power plants decided to consolidate from all departments to a single one, and we are at the beginning of that transition now. That is the history of consolidation up to date, the result of twenty years. Bye and bye, we will have another exposure, and some one will consolidate the machine shops; then several years afterwards, the foundries; then several years afterwards, something else; until finally each department will end up with a different kind of shop each; and in about one hundred and fifty years the six offices will be consolidated and will still be receiving orders from all the same old bureaus.

Why piece-meal the long-drawn-out agony?

On page 83 the board's report shows each department a little shipyard in itself. Why not consolidate all the little shipyards into a single shipyard—but not leave several bureaus to fight over it, as the board said, in Admiral Luce's italics on page 84, "it is absolutely necessary to begin within the Navy Department itself." That is, consolidate industrial bureaus, and all the rest is bound to follow.

Captain J. C. WILSON, U. S. Navy.—The importance of the subject which Rear-Admiral Luce treats in such a convincing manner seems to have been recognized by the several Secretaries of the Navy, and naval

officers of high rank, belonging to what might be termed the military part of the service. It has always been recognized that a civilian Secretary of the Navy was not equipped with the necessary technical knowledge to carry on his duties without expert advice and assistance. Such expert advice and assistance has for many years come from the chiefs of the various Bureaus of the Department and more especially from the Chief of the Bureau of Navigation. This has never been an efficient or satisfactory method and has always been productive of confusion, lack of system, and even antagonism between the various bureaus until neither the Secretary, Congress, nor the service knew where to turn to gain an unprejudiced, well-considered plan for anything affecting the administration or development of the service. The results of such a system have been deplorable from every point of view, and as the naval establishment increased, and the questions affecting construction and administration grew more and more difficult of solving, the bureau system of advisory duties became more and more confusing, and hopeless of good results.

Out of the Board of Experts gathered to advise the Secretary during the late war with Spain, grew the present "General Board," and it has been practically impossible ever since its establishment to do without the services of such a board. This is acknowledged by every one who is in any way interested in the administration of the Navy Department, the only point of difference being that while the present Secretary (as well as his predecessors), and a majority of officers whose opinions have been publicly expressed on the subject, are in favor of making this "Board" permanent, and giving it a legal status under the name of "The General Staff of the Navy," there are a strong minority who are opposed to it, and have thus far been able to prevent its establishment by legislation. This minority do not object to the constitution or duties of the present "General Board," but object to such a board being given a legal status: first, because in their opinion this would have the effect of making the Secretary of the Navy an ornamental figure-head; second, that the measure savors too much of militarism; third, that the military element of the Navy Department has all the power and all the influence that it ought to have, and additionally that there is a fear that such a board once legally incorporated by Congress would usurp the functions and duties now provided by law as belonging to the several bureaus.

Throughout all these mentioned objections (which were made before the House Naval Committee) is to be seen the spirit of deep-seated objection to recognizing the navy as a military establishment. It is a military establishment and cannot be made anything else without practically destroying its usefulness, and to these efforts to reduce it to a civil establishment may be attributed the lack of system of central policy of administration and construction which has always characterized our navy. And, in addition, one may look no further to seek the cause of the large percentage of desertions from the service.

The American people, as a whole, are non-essentially military, and opposed to all military control and power, and only submitting to so much of it as has been found to be absolutely necessary for the maintenance of

an army and navy. The accessories of military control, which are accepted without question by other nations as being necessary for the efficient administration of affairs, are either accepted by our people with supicion and a spirit of antagonism or, as in the present case, openly objected to "as savoring too much of military control."

Keeping this point in view, it is not difficult to establish a General Naval Staff whose duties and the constitution of which would be so provided for in the act of incorporation as to remove all such fear, and with this object in view I some time ago drew up a bill which, from my point of view, meets the requirements of the service, while providing that the "General Staff" does not assume undue military control, nor interfere with the duties delegated by law to the several bureaus of the Department. I herewith enclose a copy of this proposed bill and request that it be printed in connection with this discussion.

It is true that such assistance as the Secretary of the Navy may require in the administration of the duties of his office can be obtained from the General Board as now constituted, but the trouble is that a new Secretary may not wish any advise on any subject whatever and may decide to do without a General Board, or may change its functions or composition in such a way as to make its advice useless, and the mere fact that such a "Board" has no legal status and has no duties prescribed by law, but is the creation of the Secretary and subject to changes in every respect (including dissolution) at his will, makes it a body of little or much importance, according to the attitude of the Secretary respecting it, and places it in a position secondary to all the bureaus of the Department constituted by law, whereas from its composition and importance of its legitimate duties it should be the body of highest position under the Secretary in the Department. The necessity of an advisory board or staff in the administration of naval affairs is, I believe, practically unquestioned, the only question being, shall such a board or staff be convened and dissolved at the pleasure of any Secretary, or is its importance of such a nature as to make its permanent status a necessity both for the assistance it may be to the Secretary as well as the influence its opinions and recommendations may have upon Congress and the people.

There is no question in my mind that a General Staff for the navy is a military as well as a civil necessity for the successful administration of the Navy Department, but especially so, that: First, our navy may be constructed according to a well considered expert policy; second, that the rules and regulations governing the personnel of the service may be controlled under the advice of a legally constituted and properly equipped expert staff; third, that the fleets may be disposed of and drilled to the best advantage in times of peace; fourth, that the information gained by the Naval War College and the Office of Naval Intelligence may be brought together and discussed, and from such information strategic war measures may be decided upon, so that we will not be found in a condition of unpreparedness on the breaking out of hostilities; fifth, to advise the Secretary of the Navy at all times in matters pertaining to the military administration of the navy. These duties are surely of sufficient importance to

give a legal status to a General Staff and make their duties second to those of no other body of officers under the Secretary, and thanks are due to the author of the article under discussion for so clearly tracing the history of naval administration as to show the preponderating weight of opinions as to the necessity of the establishment of "A General Staff" legally incorporated by Congress to assist the Secretary of the Navy in the administration of the duties of his office.

The following bill would, I think, meet the requirements of a "General Staff," and remove the present objections against it. It differs from the one referred to in the "Circular for the Information of Officers" (1904), as follows:

(a) In putting the "General Staff" on the same footing as a "Bureau" of the Navy Department, and providing that the chief of staff shall be nominated by the Secretary of the Navy, and appointed by the President, by and with the advice and consent of the Senate. This enables the Secretary to choose his own chief of staff (military adviser), requires the nomination to be ratified by the President, and confirmed by the Senate, which would seem to hedge an appointment around with sufficient safeguards to satisfy anyone. It seems to me such an appointment would give the Secretary the military adviser required, and remove objections to the bill on that score.

(b) In providing that a marine officer should be a member of the "General Staff." It seems to me that when questions affecting the disposition of the marines, or the administration of the corps, are discussed, it would be well to have a marine officer on the board, not only to meet the objections in that line, but because his advice and counsel should be particularly valuable in such cases.

(c) Increasing the limit of continuous service on the staff from three to four years, and not requiring any sea duty to intervene. The chief of staff under the bill herein proposed would be appointed for a period of four years, and it might be desirable to continue other officers as members of the "Staff" the same length of time, which of course would be in the discretion of the Secretary. Also it might not always be practicable to give a captain, who has completed his term of sea service, a change to go to sea again, and it might be desirable to utilize his services on the board again before his retirement from active service.

(d) Stipulating that the duties of the "General Staff" shall be advisory and not executive, and that its determinations and recommendations shall be subject to the approval of the Secretary of the Navy, and not to include such duties as are now, or may be in the future, assigned to any of the several bureaus of the Department of the Navy, as now established by law. This seems to be the intention of the Department, but I think if the duties of the "General Staff" were specified as suggested it would remove opposition in that direction.

I do not think it desirable that the admiral or ranking officer of the navy should be designated by law as the "Chief of Staff," as he could be nominated as such if desirable.

"A BILL TO INCREASE THE EFFICIENCY OF NAVAL ADMINISTRATION, ETC."

Be it enacted by the Senate and House of Representatives of the United States of America, in Congress assembled.

That "The General Staff of the Navy" is hereby constituted, to consist of not more than five officers of the line of the navy and one of the marine corps, now below the rank of captain in the navy, or colonel in the marine corps, for general military duties connected with the naval administration.

That the Secretary of the Navy shall nominate an officer of the line of the navy, not below the rank of captain in the navy, to serve as, and have the title of, "Chief of Staff of the Navy"; such officer to be appointed by the President, by and with the advice and consent of the Senate, for a period of four years, and to have, if not of higher rank, while serving as such, the highest rank and pay of a rear-admiral of the navy. That the remaining members as herein provided for shall be detailed for duty as such by the Secretary of the Navy.

That no officer shall be detailed as a member of this "Staff" for a longer continuous period than four years, except by reason of a reappointment as "Chief of Staff," and also provided that no officer having served as a member of such "Staff" shall be eligible for a further detail thereon except after a service of two years on other duty.

That the duties of "The General Staff of the Navy," as herein constituted, shall be advisory, and not executive, and that its determinations and recommendations shall be subject to the approval of the Secretary of the Navy, and shall not include such duties as now are, or may be in the future, assigned to any of the several bureaus of the Navy Department as now constituted by law.

Captain E. B. BARRY, U. S. Navy.—The admirable essay on the Department of the Navy by Rear-Admiral Luce bristles so with facts and is so condensed an exposition of existing conditions as to excite admiration and surprise. It appears opportunely at the same time as the prize essay of the year and gives the views of a distinguished member of the modern old navy, whose mind is ever young.

I doubt if a better resumé could be given of the growth of the bureau system, and through that system of the unbusinesslike methods obtaining in our navy yards. Human nature is ever the same, and the desire for independent authority is a powerful lever aiding to perpetuate such a system. Yard machinery and power plants are now under examination and a step towards consolidation, economy, and efficiency has been taken. The quotation from the report of the board of officers in reply to the query as to business methods in our navy yards reads like a prophecy. Quietly Admiral Luce comments as follows: "One copy of this report was sent to the Senate and one copy to the House of Representatives under date of January 14, 1884. . . . It does not appear, however, that it elicited any attention, or that the charges it contained have ever been refuted, or a single statement challenged."

Here I beg to refer to some of my remarks concerning Commander Fiske's essay. Had this report been made by Councellor Skinflint and Farmer Corntossel it would have received attention; coming from naval officers the pigeon hole was the only fate awaiting it.

The arraignment of the Department and the bureaus as quoted from the writings of two Secretaries is rather hard to refute. It is a melancholy fact that General Order No. 372 of 1889 created the Board on Construction as "the only plan the law admitted" trying to remedy the want of coherence and the conflict of independent authorities that extended even to the building of vessels.

I think the admiral puts his finger on the sore spot when he writes of "our peculiar methods of naval administration and the total absence from it of the military character—that very character the President saw was wanting."

Is it known that the chiefs of all our naval bureaus are civil appointees? Because they are appointed from the navy their status in nowise differs from that of any other bureau chief under any other branch of the government. Even allowing that the individual may be of the military or rather naval type, his bureau is not. It is essentially part of the civil establishment, part of the civil Navy Department. It seems then that the question to be answered is—how to provide an executive or naval branch as opposed to a civil or financial and materiel branch.

Political and religious prejudices have served to obscure the ability of James II of England, and have rendered many blind to the great services rendered by him to the English Navy. It is a curious fact and one well worth recalling in connection with our favorite anti-navy Charles I ghost, that, when James put himself in the position of generalissimo as king, in spite of the hatred with which the successful revolutionists regarded him, the official position survived, attaching itself to the throne of England and appearing in the constitution of this country framed by our monarchy-hating forefathers.

William Jones was the only Secretary of the Navy having had naval and military experience. Strange as it may seem, his recommendations regarding the appointment of Navy Commissioners were approved, but, as usual, when the commissioners were beginning to be most needed, they were abolished, as the admiral says: "Congress went to the other extreme and, while providing for the civil administration of the Department, reduced the executive branch to a minimum." This very condition, when the military needs outgrew the civil organization, as the admiral very justly says, made the General Board. "Necessity has forced the General Board into existence." It is a makeshift at best and lacks legislative status.

In spite of bureau opposition, sooner or later the *military* (as opposed to civil) executive branch of the Navy Department must be revived and revived under the sanction of law. Call it what one will—Advisory Board, General Board, Navy Commissioners, or General Staff, it must be revived and its erstwhile opponents will discover, to their astonishment, that the Secretary of the Navy has not been eliminated from the problem.

PROFESSIONAL NOTES.

Prepared by Professor PHILIP R. ALGER, U. S. Navy.

SHIPS OF WAR, BUDGETS, AND PERSONNEL.

AUSTRIA.

VESSELS BUILDING.

Name.	Displacement.	Where Building.	Remarks.
Battleships.			
Erhersog Karl.....	10,600	Trieste.	Under trial.
Erhersog Friedrich... ...	10,600	"	Launched April 30, 1904.
Erhersog Ferdinand-Max.	10,600	"	Building.
Armored Cruiser.			
Saint Georg	7,400	Pola.	Launched Dec. 8, 1903.
River Monitors.			
Save.....	450	Neupesth.	Launched March 25, 1904.
Theiss.....	450	"	" " " "

The battleship Erzatz-Novara, building at Trieste, will be launched shortly and will be named Ferdinand-Max after the ship which rammed and sunk the Re-d'Italia at Lissa. She is of 10,600 tons displacement and 14,000 horsepower, estimated to give her a speed of 19 knots, and carries four 24-c. m., twelve 19-c. m., fourteen 7-c. m., and twelve 37-c. m. guns.

The official trial of the Austro-Hung..rian battleship Erzherzog Karl took place off Pola on the 3d inst.; 14,000 horsepower was contracted for and a speed of 19¼ knots. The trial resulted in 16,000 horsepower being developed, and the speed was 20 knots. The machinery for this vessel was constructed by the Stabilimento Tecnico, Trieste, watertube boilers of the Yarrow large tube type being adopted.—*London Times.*

The active list of executive officers of the Austrian navy stands as follows: One admiral, three vice-admirals, ten rear-admirals, twenty battleship-captains, thirty-three frigate-captains, thirty-eight corvette-captains, one hundred and forty-seven lieutenants (1st class), eighty lieutenants (2d class), two hundred and one sub-lieutenants, one hundred midshipmen, eighty-seven cadets. The medical staff consists of one medical inspector-general, two deputy inspector-generals (1st class), two deputy inspector-generals (2d class), six fleet-surgeons, eighteen staff-surgeons, eighteen surgeons, and sixteen assistant-surgeons. The engineering staff consists of six chief engineers, seventeen engineers (1st class), thirty-two engineers (2d class), forty-four engineers (3d class).—*United Sercice Institution.*

FRANCE.

VESSELS BUILDING.

Name.	Displacement.	Where Building.	Remarks.
Battleships.			
République	14,865	Brest.	Launched Sept., 1902.
Démocratie	14,865	"	" May 2, 1904.
Patrie	14,865	La Seyne.	" Dec. 17, 1903.
Justice	14,865	"	" Oct. 27, 1904.
Vérité	14,865	Bordeaux.	Building.
Liberté	14,865	St. Nazaire.	Launched April 19, 1906.
Armored Cruisers.			
Ernest Rénan	13,644	Brest.	Building.
Jules Michelet	12,550	Lorient.	"
Jules Ferry	12,550	Cherbourg.	Launched Aug. 23, 1906.
Victor Hugo	12,550	Lorient	" March 30, 1904.
Léon Gambetta	12,550	Brest.	Under trial.
Edgar Quinet	13,644	"	Ordered.
Waldeck Rousseau	13,644	Lorient.	Authorized.

A NEW FRENCH NAVAL PROGRAMME.—The inquiry carried out by the Parliamentary Commission into the condition of the French Marine, coupled with the report of M. Charles Bos upon the naval estimates, has fully prepared France for the shipbuilding programme which the new Minister of the Marine has promised to bring forward next year.

Having dealt from time to time with this inquiry, and shown the deplorable results of M. Camille Pelletan's well-meant though ill-advised efforts to reform the marine, it is unnecessary to go further into the circumstances which have compelled France to look seriously to the entire reorganization of the navy. The situation is regarded as particularly grave from the fact that the results obtained under the 1900 programme are far less than could have been reasonably expected, and that the progress of France in naval construction has been relatively slower than the advance of other countries, to the extent that, despite the sacrifices made, it may be said to have almost retrograded. Moreover, the crushing defeat of the Russian fleet has induced the French Naval Department entirely to change their views concerning the respective values of powerful battleships and swift cruisers.

In justice to this department it should be remarked that it has always advocated the construction of suitably armored battleships with a heavy armament, and when M. de Lanessan drew up his 1900 programme, in consultation with the Conseil Supérieur de la Marine, he provided for a class of battleships and armored cruisers that, had they been constructed in accordance with this programme, would have produced a powerful and homogeneous fleet. The "new school," however, with M. Lockroy at its head, fought against the battleships, and carried on an active campaign in favor of swift cruisers or commerce destroyers and submarines, under the impression that, as it was impossible to compete with England in battleships, it was, at all events, open to France to sink them with the new submarine craft and ruin the country by waging a war on commerce.

M. Pelletan went still further, and created a type of cruiser, like the Guichen and Chateaurenault, in which everything was sacrificed to speed. As fighting units they have no value whatever, and it is now generally admitted that the money spent upon them is absolutely lost. As these amateur efforts at creating a new marine were entirely in opposition to the views of the Conseil Supérieur de la Marine, M. Pelletan was careful not to consult that body on any occasion. During his administration the conseil, composed of the most distinguished admirals and naval architects, was practically a nonentity. Parliament has decided to change all this, and

in M. Thomson the country has a Minister who has promised to act in accordance with the views of the Conseil Supérieur de la Marine. France has had enough of the "new school" of naval architects and reformers, and is anxious to return to the old traditions of a sound marine under the control of an experienced body.

This change has undoubtedly been hastened by the palpable lessons of the war in the Far East. Victory has been on the side of the heaviest battleships. M. le Moigne stated in the Chamber of Deputies that "the triumph of the Japanese fleet was a victory for English construction," and this, as well as the general tone of the debate, conveys an impression that the French have at last seen the futility of endeavoring to rival England's sea power by other means. It has, indeed, made a virtue of necessity by ostensibly ceasing this rivalry, for there is another growing naval power in Germany, which the French consider needs their first attention. M. Charles Bos made an exhaustive comparison in the Chamber between the progress of naval construction in France and Germany, and showed that if things continue as they are at present the French navy will, in 1907, be actually outstripped by the naval power of the Fatherland. This would be the beginning of the end. Moreover, the German navy will be entirely new, none of the vessels being of an earlier date than 1891, which is also the case with England now that the obsolete vessels have been laid off, and this has brought home to France the uselessness of many of her fighting units. M. Charles Bos admitted that the navy was nothing like so strong as it looked on paper. By suppressing obsolete ships, he says, the first line is composed of only twelve first-class battleships instead of twenty-four, four coast-defence battleships instead of thirteen, nineteen armored cruisers and thirty-two destroyers. To these, of course, must be added the ships being built or awaiting commission under the 1900 programme, and consisting of six battleships, five armored cruisers, twenty-eight destroyers, and a large number of torpedo-boats and submarines. At present there are 135 torpedo-boats and fifty-five submarines built or under construction. Had all these vessels been built under the conditions of the programme in 1906, the navy would still have been an imposing one, but owing to the delays in construction the work will not be completed until 1908, while the continuous changes made in the design of battleships and cruisers during building have seriously affected the homogeneity of the fleet. As a fighting force it has been depreciated by the amateur experiments of the "new school" of speed enthusiasts.

In the opinion of M. Thomson, the only means of placing the navy on a sound basis is to clear the 1900 programme out of the way and start upon the execution of another as soon as possible. In other words, the credits for 1905, amounting to 318,688,469f., practically complete the total that was sanctioned five years ago, and pending the construction of the remaining vessels during the next three years it is intended to push forward plans of new ships which may be started as soon as the existing ones are off the stocks. Meanwhile, the Minister has resolved to do the best he can with the vessels under construction. There are, for instance, three armored cruisers, Ernest Rénan, Edgar Quinet, and Waldeck Rousseau, which were all repeatedly modified by M. Pelletan, until they have entirely lost their character of homogeneity. The displacement of the Ernest Rénan was increased from 12,550 tons to 13,562 tons, and again to 13,644 tons. The Edgar Quinet more nearly approaches the original plan, but the Waldeck Rousseau was to have been the longest and swiftest cruiser ever constructed in France. With a displacement of 14,300 tons, its length was to have been 161 meters, or four meters more than the Ernest Rénan. With an engine power of 40,000 horsepower it was to steam at 24 knots. The armament was to be composed of two 240-mm. guns, sixteen of 164.7, eight of 65. sixteen of 47, and two of 23. The only advantage of the Waldeck Rousseau lies in her speed, which, said one of the deputies, will enable her to run away from the enemy, for it is hopeless to expect such a vessel to make

any show of fighting when a single shot will send her to the bottom. On account of her length the cruiser will be difficult to manage, and there are only one or two docks big enough to take her. Moreover, the enormous fuel consumption would give her a comparatively small range of action. As a good deal of progress has been made with the construction of the Ernest Rénan the Minister has had no alternative but to build the other two on the same lines, and for this reason work on the Edgar Quinet has been suspended. While having the same dimensions as the Ernest Rénan, the two new cruisers will be equipped with more powerful armament, and, like the Jules Ferry, will have sixteen guns of 1647, instead of twelve on the Ernest Rénan, as well as the latest type of 194-mm. guns, which is said to have exactly the same effect as the old 240 pattern. In this way the three cruisers will form a homogeneous division with a more powerful armament. This question of armament is another upon which the Minister is anxious to return to old traditions. The guns have been the subject of as much experiment as the vessels themselves. Here, again, the results of the Russo-Japanese naval battles have impressed upon the French Chamber the advisability not only of building heavily armored battleships but of equipping them with the heaviest artillery. It is considered doubtful whether French artillery engineers are altogether working upon the right lines in an endeavor to get the flattest trajectory, in the belief that battles will be decided at a distance of 1000 m. In the Far East the proportion of hits at much longer ranges was remarkable, and this proof of accurate firing has caused opinion to veer round in favor of big guns with the longest possible range. Again, the Minister, as well as those deputies experienced in naval matters, objected to the way in which new types of guns are being constantly introduced into vessels already afloat, with the result that there is an inconvenient variety of guns which complicate maters by necessitating a considerable variety of ammunition. It is therefore proposed to hasten the construction of guns of particular types, so that they may be placed on the vessels building, reserving newer patterns that may be brought out for future ships.

While the Minister has pledged himself to construct powerful battleships and armored cruisers of real fighting value, he is equally in favor of building up a flotilla of submersible boats. Nevertheless, he is departing entirely from the policy of his predessor. M. Pelletan divided and subdivided these little craft to such an extent that he finally settled upon a 50-ton submarine known as the Guêpe type, of which he ordered ten to be constructed. It was to be fitted with a new internal combustion engine, so designed as to prevent any discharge of exhaust gases in the boat when under water. The French Chamber, however, will have nothing to do with these boats, which it considers would be of no value whatever, except as an experiment, and there is no reason why the new motor should not be tried on one of the existing boats in the same way as what is called an "oxygen" engine is being tested on the Naiade. The Minister has therefore cancelled the order for eight Guêpe submarines, leaving only two already under construction. The policy of building purely defensive submarines of very light tonnage and small range of action finds no favor in the present naval administration, which, in view of the experiments already carried out in France, and of the example of Great Britain in building heavier submersibles, is of the opinion that the only suitable type is the submersible capable of carrying out offensive operations. It is therefore fairly certain that the small submarines that have been cancelled will be replaced by submersibles of 200, 250, and even 350 tons. In the same way the torpedo-boat is developing in the direction of bigger tonnage. One of the deputies alluded in the debate to the "failure of the torpedo-boat" in the Far East, and the fact that he should have condemned what was at one time the most favorite means of defence without eliciting a murmur, shows how much naval opinion has changed during the past few months. This does not imply that the French marine will give less attention to the

torpedo-boat. It only means that the submarines will take the place of the smaller torpedo-boats, and that the first-class torpedo-boats, as well as the destroyers, will be of much larger tonnage. The debate in the Chamber might lead one to suppose that the new Minister had made a profitable study of British naval types, and was following them in almost every detail.

Unless means are found of carrying out a programme satisfactory, its value is considerably diminished. The arsenals and private shipyards must have a sufficient large capacity of production, and the cost of construction must be reduced as much as possible. The remarkable results obtained by the late administration with the eight hours' day, and the general leveling down of social rank, whereby the admiral was just as good as the seaman, and the foreman had to apologize for giving an order to a workman, have already been dealt with in these columns. The Parliamentary Commission found anarchy reigning everywhere, and an entire absence of discipline on board ship. All this has to be changed. It is proposed to introduce piece-work wherever possible, with a limit of production to prevent the hands from being so foolish as to over-work themselves. The Parliamentary Commission found the arsenals badly equipped with labor-saving machinery, and with the introduction of high-speed tool steel the greater part of the mechanism employed in the arsenals is worse than useless. All this machinery will have to be renewed. It is also proposed to devote the five arsenals to special classes of work for which each is particularly suited, instead of building vessels of the same type at different ports. There are many other reforms aiming at rapid and cheap construction which it is unnecessary to go into here. The colonial defences are to receive particular attention, especially those of Indo-China, which possession the colonial party are convinced is destined to be attacked at some time or another by Japan. They want to bring up the squadron in the Far East to its normal strength of twelve armored cruisers, and organize a line of defence consisting of destroyers, first-class torpedo-boats, and submarines, with six centers of action around the Indo-Chinese coast. A perfect hydrographical survey is also needed to prevent a recurrence of such accidents as that which resulted in the loss of the fine new cruiser Sully by running on a sunken reef. There is also the question of manning the fleet, which is already seriously short-handed, and it is suggested that special inducements should be offered if the recruiting of seamen is not to suffer from the new law reducing the military service to two years. The efficiency of the navy is to be maintained by reviving the maneuvers which were suppressed by M. Pelletan, and the vessels will spend as much time at sea as possible instead of lying up at the ports. There is no single branch of the service in which a reform is not needed, and the country hopes that in M. Thomson they have a strong man who is capable of carrying out this formidable task, with the aid of the Conseil Supérieur de la Marine. All this will entail a considerable expenditure of public money, and Parliament was somewhat nervous over the country being called upon to make still further heavy sacrifices for the new programme. M. Thomson, however, merely asked Parliament to continue voting the sums that had been granted annually since 1900. Next year he will present the first part of a programme consisting probably of seven battleships, twenty armored cruisers, thirty destroyers, and one hundred torpedo-boats, and submersibles, for which a millard francs will be spread over a number of years. This is the beginning of a definite policy for building up a powerful and homogeneous fleet, which Parliament intends shall no longer be at the mercy of Ministers who override the Conseil Supérieur de la Marine and introduce peculiar ideas of their own.

The French Minister of Marine has announced that of the six battleships at present under construction two will be ready for commissioning in 1906 and the others in 1907, one in the spring, two in the summer, and

one in the late autumn of that year. As regards protected cruisers, he said that two would be commissioned and begin their trials in 1905, two in 1906 and one in 1908. The vote for new construction in 1905 was passed at 121,000,000f. (£4,840,000).—*Page's Weekly.*

The new French battleship Liberté was successfully launched from the Loire shipbuilding yards on April 19. *Le Yacht* gives the following particulars regarding the vessel: Displacement, 14,868 tons; length, 439 feet; beam, 79.56 feet; draft, 27.46 feet; engines, 18,000 horsepower; speed, 18 knots. The original estimate, not including artillery and boilers, was £1,075,320, but alterations in the plans of the ship during construction will augment this estimate considerably. Instead of eighteen 6.48-inch guns, as originally intended, she is to carry ten 7.63-inch guns. There has been no alteration with regard to her heaviest guns, which are to be four 12-inch.—*United Service Gazette.*

The Léon Gambetta, which is the first of the French armored cruisers of 12,600 tons to be completed of those laid down in the programme of M. de Lanessan, has made most successful trials, offering a marked contrast to the Jeanne d'Arc, which did not attain the anticipated speed. She developed 29,008 mean horsepower, and a maximum of 30,500 horsepower. The mean speed was 23.1 knots, and on some runs 24 knots was attained. The intended horsepower was 27,500, and the speed 22 knots. The cruiser is provided with Niclausse boilers, which gave excellent results, producing steam in abundance. It is notable that this maximum speed trial was made only forty-eight hours after the endurance trial of twenty-four hours steaming. The success is a record for the port of Brest. Something is due to the lines upon which the ship is built, and the lesson of the Jeanne d'Arc has not been lost. The three engines are of the vertical triple expansion type, with four cylinders. The gun trials have also been successful.—*Army and Navy Gazette.*

The armored cruiser Victor Hugo is making rapid progress at Lorient, and the trials are expected to begin during the course of the year. The Jules Michelet will be launched at the port at the end of the summer, and will be replaced on the slips by the Waldeck Rousseau, recently known as C 17. This cruiser was to have had the dimensions of the Ernest Rénan, but with better speed, but M. Thomson has decided that her characteristics shall be those of the Edgar Quinet, but with the armament of the Jules Ferry. In the annexe to the budget she is given a displacement of 13,700 tons and with engines of 36,000 horsepower is to steam at 23 knots, having a range of 12,000 miles at 10 knots, and carrying 2300 tons of coal. She will have four guns of 7.6-inch, sixteen of 6.4-inch, twenty-four 3-pdr., two 1-pdr., and two submerged torpedo-tubes. The Ernest Rénan will differ from the Waldeck Rousseau in having only twelve 6.4-inch guns, owing to the absence of double turrets. It is pointed out as a defect of both vessels that they will have nothing more powerful than 3-pdr. guns as a defence against torpedo-boats. The cost of the new vessel will be 29,077,023 francs. It is expected that she will attain the desired speed without difficulty, and she certainly promises to be a very remarkable vessel. She comes a little late, for it is possible that by 1909, when she would be completed, the caliber of guns in armored cruisers will have been increased. —*Army and Navy Gazette.*

It is still uncertain whether the French armored cruiser Sully can be floated and made effective again. At Brest there have been rumors that the case was hopeless, and the Amiral Aube was named as likely to replace the injured vessel. This was incorrect, but it is now announced that the Dupetit-Thouars, which is now undergoing trials at Toulon, will go out to replace the Sully. The Bay of Along seems to be a very dangerous place,

or to be very badly charted, for Rear-Admiral Bayle's flagship, since the mishap to the Sully, has touched on another rock there, though, fortunately, without any serious damage.—*Army and Navy Gazette.*

We have already given many details concerning the recent comparative trials of the French submersibles and submarines Aigrette and Z. The *Yacht* adds some further particulars, remarking that a good deal remains yet to be done before either class of boat will answer the expectations formed of it. The fault was in the matter of speed. On the surface the Aigrette gave 8.72 knots instead of 9.25 knots, as promised, and, submerged, 6.35 knots instead of 6.7 knots, while the surface speed of the Z was 8.3 knots instead of 11 knots, and the submerged speed 4 knots instead of 7.46 knots.—*Army and Navy Gazette.*

It is reported that the commander of the new first-class armored cruiser Marseillaise has made the following complaints with regard to his ship: 1. Feeble armament relative to displacement. 2. Insufficient protection at base of turrets. 3. Instability of gun platforms. 4. Speed endurance doubtful. 5. Derangement of compasses by vibrations at speeds of 17 or more knots. 6. Leakage fore and aft due to same vibrations. 7. Non-drainage of rain and sea water from upper deck. 8. Smallness of space for stowing the anchors. 9. Tendency of cable to slip from sprocket-wheel of capstan when turning back. 10. Want of ventilation in drying chambers. 11. Want of protection of crews of 3.9-inch guns against blowing off of 6.5-inch guns. 12. Bad distribution of small guns. 13. Uselessness of only slightly protected torpedo-tubes aft. 14. Weakness of after part of main deck, where the vibration interferes with accuracy of fire. 15. Complicated transport of search-lights under shelter of armor deck. 16. Bad position of the "Thirions" pumps. 17. Insufficient thickness of boiler-plates, which will not bear long usage. 18. Noise and vibrations of ventilators. 19. Failure of heating between decks.—*United Service Institution.*

Rear-Admirals Kiésel and Krantz, who have just been promoted to that rank, are fifty-eight and fifty-six years of age respectively, and have the one thirty-nine, and the other thirty-seven years of service.

GERMANY.

VESSELS BUILDING.

Name.	Displacement.	Where Building.	Remarks.	Est. date of completion.
Battleships.				
Preussen	13,200	Stettin.	Under trial.	June, 1905.
Hessen	13,200	Kiel.	"	Aug., 1905.
Lothringen	13,200	Danzic.	Launched May 27, 1904.	May, 1906.
Deutschland	13,200	Gaarden.	" Nov. 19, 1904.	Sept. 1906.
O	13,200	Stettin.	Building.	
P	13,200	Danzic.	"	
		(Schichau Works.)		
Armored Cruisers.				
Roon	9,500	Kiel.	Launched June 27, 1903.	Nov., 1905.
York	9,500	Hamburg.	" May 14, 1904.	Feb., 1906.
C	9,700	Bremen.	" Building.	
D	9,700	——	Projected.	
Protected Cruisers.				
Munich	3,000	Bremen.	Under trial.	
Lübeck	3,000	Stettin.	"	
Ersatz Alexandrine	3,200	Kiel.	Building.	
" Meteor	3,200	Danzic.	"	
Leipsig	3,200	Bremen.	Launched Mar. 22, 1905.	
O	3,400	Danzic.	Projected.	
Ersatz Wacht	3,400	"	"	
" Blitz	3,400	"	"	

On the second reading of the German navy estimates in the Reichstag, certain of the votes were struck out. Credits were refused for the gunboat C, and for a river gunboat without debate. For the supply of guns a sum of 1,260,000 marks was refused, affecting the amounts necessary for the battleships Q and R (each 300,000 marks), the large cruiser D (100,000 marks), and the small cruisers O, Ersatz Wacht, and Ersatz Blitz (each 100,000). This measure of economy is in restriction and not refusal of the votes necessary to put the work in hand. The whole of the sum necessary for the gun armament of two gunboats which have been struck out is, however, refused. On the extraordinary estimates there were also reductions, including the third instalment for the supply of mines, the second for the removal of the naval school from Kiel to Mürwik, near Flensburg, and estimates for other special purposes.—*Army and Navy Gazette.*

The discussions on the German navy estimates were a trifle acrimonious and in the end the original amount of the estimates £11,610,000 (M. 232,200,000), was reduced by £159,000 (M. 3,198,000). The total number of men voted was 36,622.—*Page's Weekly.*

Several German vessels will be launched during the present year and before the close of the financial year. These are the first specially-built supply ships which the Weser company has in hand at Bremen, and a tender for the gunnery school ship. Next, the small cruiser N will be launched at the Weser yard, Gröpeling, and the sister vessels Ersatz Alexandrine and Ersatz Meteor will take the water at Kiel and Danzig. It is expected also to launch the armored cruiser C at Bremen, the battleship O at Stettin, and P at Wilhelmshaven.—*Army and Navy Gazette.*

Ueberall states that the German small cruiser O will be laid down at the Imperial yard, Danzig, while the other vessels of the same class belonging to the year's programme—Ersatz Wacht and Ersatz Blitz—are likely to be built in private yards. The Danzig yard is about to deliver the Berlin, and during the summer will be busy with the O and Ersatz Alexandrine, which last is likely to be launched in September. O will be somewhat larger than her sisters, displacing 3400 tons as compared with 3200 tons. She is to be ready for her trials within two years. From the same paper we learn that the new floating dock at Duala, Kamerun, has for some weeks been in readiness for the reception of the German vessels on the West Africa Station, which have hitherto been docked at Cape Town. The dock can only take vessels up to about 1200 tons, so that larger vessels must still go to Cape Town, and, indeed, in view of the advantage of sending the ships away from the tropics from time to time, Cape Town is still likely to see a good deal of the German West Africa Squadron.—*Army and Navy Gazette.*

The *Moniteur de la Flotte* states that the armored cruisers C and D are to be of 200 tons greater displacement than their predecessors, the York class, and are to have 22.5 knots' speed, with 26,000 horsepower.

The small cruiser Lübeck, the first German warship fitted with turbines, has successfully passed its speed tests at Swinemünde, near Kiel.—*United Service Gazette.*

Several German ships have recently run their full power trials. The results were:

	I.H.P.
Elsass	16,812 = 18.74 knots.
Ægir	5,552 = 15.54 knots.
München	12,388 = 23.45 knots.

The decimals in each case indicate the amount over the contract. All the results are, however, maxima.—*Engineer.*

GREAT BRITAIN.

VESSELS BUILDING.

Name.	Displacement.	Where Building.	Remarks.
Battleships.			
Lord Nelson	16,500	Jarrow (Palmer).	Building.
Agamemnon	16,500	Glasgow (Beardmore).	"
Africa	16,350	Chatham.	Launched May 20, 1905.
Britannia	16,350	Portsmouth.	" Dec 10, 1904.
Hibernia	16,350	Devonport.	" June 17, 1905.
Hindostan	16,350	Clydebank.	Launched Dec. 18, 1903.
New Zealand	16,350	Portsmouth.	Under trial.
Dominion	16,350	London.	"
Armored Cruisers.			
Minotaur	14,600	Devonport.	Building.
Shannon	14,600	Chatham.	Launched May 20, 1905.
Defence	14,600	Pembroke.	Building.
Duke of Edinburgh	13,500	Pembroke.	Launched June 14, 1904.
Black Prince	13,500	Blackwall.	" Nov. 8, 1904.
Warrior	13,500	Pembroke.	Building.
Cochrane	13,500	Glasgow.	Launched May 20, 1905.
Natal	13,500	Barrow.	Building.
Achilles	13,500	Newcastle.	"
Hampshire	10,700	Elswick.	Under trial.
Devonshire	10,700	Chatham.	"
Roxburgh	10,700	Glasgow.	"
Antrim	10,700	Clydebank.	"
Argyll	10,700	Greenock.	"
Scouts.			
Adventure	2,750	Elswick.	Launched Sept. 9, 1904.
Forward	2,545	Fairfield.	" Aug. 27, 1904.
Pathfinder	2,610	Birkenhead.	Under trial.
Sentinel	2,900	Vickers.	"
Skirmisher	2,900	"	Launched Feb. 7, 1905.
Foresight	2,545	Fairfield.	" Oct. 8, 1904.
Attentive	2,750	Elswick.	Building.
Patrol	2,610	Birkenhead.	Launched Oct. 12, 1904.

THE BRITISH NAVAL PROGRAMME FOR 1905.—The serious and far-reaching alteration in the balance of naval power in Europe, caused by the destruction of the Russian Pacific fleet by the Japanese, has manifested itself in the naval estimates of Great Britain for the coming year. So great is this influence, that not only has the amount of money allotted for naval purposes been appreciably reduced, but several war vessels authorized in the 1904 programme have been definitely abandoned, while for the first time in twenty years the personnel of the navy is to be diminished. Such a radical departure from progression on the part of the British government serves to throw the effect produced by the destruction of Russia's navy into significance, since had there been no war in the East, Great Britain would have been compelled to maintain the policy which has been carefully followed each successive year for many years past.

Another fact that has affected the British naval plans is the reorganization of the navy carried out by Sir John Fisher upon his accession to the premier post of the Admiralty. By his scheme all the less valuable and obsolete vessels in the British navy have been eliminated. Over one hundred vessels have been removed by his drastic measure, with the consequence that the navy has been rendered more heterogeneous and efficient, and is now a better fighting force than ever.

The sum estimated to fulfill the requirements of the British navy during the coming year is $166,945,000, as compared with $184,445,000 required for

1904, showing a reduction of $18,500,000. Of this sum $47,830,000 is to be devoted to new construction, representing a decrease of $10,440,000 upon the amount expended for this purpose last year. Of the programme authorized last year, it is intended to abandon the construction of one armored cruiser and a number of destroyers. Exactly how many of the latter it has been decided to forego is not divulged, however.

During the coming year the following vessels are to be laid down—one battleship, four armored cruisers, twelve coastal destroyers, six ocean-going destroyers, and eleven submarines. No details, however, are forthcoming of these new ships. During the past year the present fleet has been augmented by four battleships—King Edward VII, Commonwealth, Swiftsure, and Triumph; one armored cruiser; four third-class cruisers; twelve submarines; nine destroyers; four torpedo-boats, and one river gunboat. There are now in course of construction 62 vessels, comprising eight battleships, fifteen armored cruisers, one second-class cruiser, one third-class cruiser, eight scouts, eighteen destroyers, and eleven submarines.

With regard to the destroyers, in the course of the development of this class of fighting unit, two qualities have successively predominated, namely, speed and sea-keeping power. Their study of the tactical and other questions involved has led the Department to the conclusion that two classes of destroyers are requisite, one especially for ocean-going operations, and the other for use in the narrow seas. The Naval Board has accordingly decided to combine the qualities of speed and sea-keeping power in a special type of ocean-going destroyer which will be expensive, and of which therefore the number must be comparatively few, and to design a new type of coastal destroyer which will be comparatively cheap, and of which consequently a larger number can be obtained.

The policy of sending ships to private yards has proved completely successful, and the arrears in the repairs of the fleet have been completely overcome. It is not therefore necessary to provide during the coming year for repairs of any ships in private yards. It is intended to utilize the government yards for the purpose of keeping the present vessels in complete repair rather than to employ them for new constructional work. The building of new vessels has been demonstrated by actual experience to be carried out with greater economy in private than in the government yards, while on the other haid, repairs can be more cheaply effected in the latter than in the former.

It is intended to continue the experiments with oil fuel, but it is now quite certain that oil has firmly become established as part of the fuel in the navy, and every arrangement is being made for its supply, storage, and distribution. In connection with this point, it may be stated that already huge reservoirs are in course of erection at Portsmouth dockyard for the storage of the oil, and suitable apparatus is being installed for the transfer of the latter to the compartments intended for storage in the holds of the battleships with facility and celerity.

During the coming year a large number of heavy guns are to be constructed, to meet the armament requirements of the vessels now in course of erection. These weapons comprise 12-inch 45-caliber and 9.2-inch 50-caliber weapons for the battleships, and 9.2-inch and 7.5-inch 50-caliber guns for the first-class armored cruisers.

Exhaustive experiments have been carried out with night sights, with the result that a good optical sight has been obtained, which is to be adopted in the more important gun mountings. A new type of armor-piercing projectile, from which greater penetration can be obtained, has been satisfactorily tested, and is being introduced for all guns of 6-inch and higher caliber. Improvements in submerged dicharges and torpedo-rooms are being effected, to enable more rapid loading to be carried out. A new torpedo with increased range and speed has been designed, and severe and prolonged trials are now in progress with it upon the torpedo range at Portland. Searchlights have been improved by the general introduction

of automatic lamps. Experiments are also in progress at sea with electrically-controlled projectors.

Another important feature, and one which will commend itself to engineers, is the policy of standardization that has been adopted. By co-operation with the machinery manufacturers it has been found practicable to make almost the whole of the main and auxiliary machinery and boilers fitted in ships of the same class, of similar design and interchangeable. In the six first-class armored cruisers of the Duke of Edinburgh class, this principle has been brought into effect, and it is now in process of development for the machinery of ships of the Lord Nelson and Minotaur types. By dealing with vessels in classes, progress is not retarded by such standardization. Admiralty representatives have been associated with the various sub-committees of the Standards Committee, and Admiralty and commercial practice have been assimilated in many features with benefit to each.

The First Lord of the Admiralty states that the fleet has "never been in more perfect state of repair than it is at the present moment," which is most satisfactory, and is due in no small measure to the rigorous policy of the department during the past two or three years, and the wholesale elimination from the fighting strength of all those vessels which do not coincide with modern naval requirements, and which could only be rendered efficient and up-to-date by the expenditure of large sums of money. It is also intended to inaugurate a policy by which, while fewer ships will be in course of construction simultaneously, the time occupied in such work will be considerably expedited. At the present time the building of a battleship, from the laying down of the keel to its actual commission, varies from 30 to 36 months. This work, however, under the new scheme is to be appreciably accelerated.—*Scientific American.*

The Admiralty has decided to introduce turbine machinery into the new battleships to be built under this year's programme. Hitherto turbines have been confined to torpedo-craft, but the official experts have now sufficient data to encourage their being applied to large battleships. The new vessel will be capable of developing 23,000 horse-power, and will not only be the most powerful yet designed, but the fastest of her class in the world. Tenders are to be in by the middle of June.—*United Service Gazette.*

The new cruisers of the Minotaur class will be built of high tensile steel instead of ordinary steel, and the armor deck made of K. N. C. instead of the usual boiler-plates.—*Engineer.*

Orders have just been placed by the Admiralty for twelve of the new coastal torpedo-boat destroyers—five of which will be built by Messrs. Thornycroft, of Chiswick and Southampton; five by Messrs. White, of Cowes; and two by Messrs. Yarrow, of London. This exhausts the list for the present year, but five or six sea destroyers have yet to be arranged for. The feature of these new coastal destroyers is that all will be fitted with Parsons steam turbines, two for cruising and three for full speed, with two for astern motion as in the "Eden," which has given so much satisfaction. The dimensions of these boats will correspond with the later first class torpedo-boats; they will be 10ft. longer, being 175 ft., the displacement will be 280 or 290 tons, as compared with 240 tons, and the power and the propelling machinery will be 3500 tons, as compared with 3400 tons. The speed guaranteed is 26 knots as against 25½ knots. But there will be these important differences, that oil fuel will be used and that the quantity to be carried on the full-power trial will greatly exceed that on the torpedo-boats. The scantlings will be heavier, and they will have a bridge. The new boats will be stronger than our original 27-knot destroyers, and they will also have a greater fuel supply on board. They will be 25ft. to 35ft. shorter than these early boats, and of 40 tons less

displacement, so that their engine power will be 500 i. h. p. to 800 i. h. p. less, although the speed is only a mile per hour less. Indeed, with the one exception of speed, they will be superior boats to the 30-knot craft, and in view of more ample steam generating plant, and the adoption of turbines, their 26-knots will be easily reached, while their heavier scantlings will make them more seaworthy. In an emergency they will not be so useful as the 30-knot boat, but the new sea destroyers will more frequently have to face the enemy's superior craft, since the 26-knot boats are intended more for defence than for aggressive action against the enemy.—*United Service Gazette.*

EXTRACTS FROM THE FIRST LORD'S "STATEMENT EXPLANATORY OF THE NAVY ESTIMATES, 1905-1906."—No important changes have taken place in the organization of the Admiralty during the past year, and the changes reported in previous years are all working well. By a new Order in Council, dated 10th August, 1904, the final step was taken in the readjustment of the distribution of business to the members of the Board by eliminating from the work of the Senior Naval Lord everything that is not concerned with important naval policy and the preparation of the fleet for war. The opportunity was taken at the same time to restore the old title of sea lord, and the titles of the naval members of the Board henceforth will be first sea lord, second sea lord, third sea lord and controller, fourth sea lord.

I have to announce that the Board have appointed a special committee to inquire into the present system of dockyard organization and administration as it effects the personnel and the execution of ship-building and repairs. It is hoped that an increase of efficiency and of economy will result from the labors of the committee, and it is especially desired that references and correspondence may be minimized, and that a fuller decentralization of the dockyards from the Admiralty and an ampler devolution of responsibility upon the admiral's superintendent may be achieved.

In my memorandum of last year I mentioned that a scheme had been adopted in connection with the medical branch and the chaplains of the navy to enable young surgeons and young clergymen, who might not desire to make the navy their permanent sphere of work, to join it for four or five years, at the end of which time they might either join the service permanently at the discretion of the Admiralty or leave it with a substantial gratuity. It is still too soon to say whether this scheme is going to attract additional candidates for appointment, but I wish again to draw attention to it.

In September next the first batch of cadets who joined the Royal Naval College at Osborne wil have completed two years there, and they will be transferred to the Royal Naval College at Dartmouth. Mr. Cyril E. Ashford, the first headmaster of Osborne, who has inaugurated the teaching of the college so successfully, will be transferred to Dartmouth, and henceforth every cadet entering the navy will pass his first two years at Osborne and his second two years at Dartmouth. The course of training will, of course, be consecutive. A few cadets have had to be withdrawn from the college, but none, I am happy to say, on account of unsatisfactory conduct. Those who have been withdrawn have been so withdrawn on the authority of the Board, after consultation with the captain and headmaster of the college, either on the ground that they were not likely to pass satisfactorily the examination out of the college at the end of their period of training or on the ground that they were not thoroughly suited to the conditions of naval life. The plan of inviting all boys who apply for nominations to appear before the Committee of Inspection has continued to work with complete success, and all applicants have been treated on the same basis and with scrupulous fairness.

The gunnery of the fleet continues steadily to improve, and the Admiralty have decided, with the concurrence of the treasury, to appoint a new officer called the inspector of target practice. His duties will in no

ways clash with those of the director of naval ordnance. He will not be an Admiralty officer, but, working under the superintendence of the first sea lord, he will visit the fleets and squadrons and supply the commanders-in-chief with the most recent information which the Admiralty have at their disposal.

The total number of officers, seamen, boys, and Royal Marines voted for the year 1904-5 was 131,100. The numbers asked for for 1905-6 are 129,000, showing a reduction of 2100. This reduction is consequential on the policy, explained in my memorandum of the 6th December, elminating from the navy as many ships as possible that would be comparatively ineffective fighting factors in time of war.

The policy of sending ships to the private yards has fulfilled its object, and the arrears in the repairs of the fleet have been mastered and are a thing of the past. It is not, therefore, necessary to provide next year for the repairs of any ships at the private yards, and henceforth it should be borne in mind that the first business of the royal dockyards is to keep the fleet in repair, and accordingly the amount of new construction allotted to those dockyards should be subordinated to this main consideration. We have now in the United Kingdom a splendid national asset in the numerous private yards, and experience has shown that, whereas new construction can certainly be as cheaply executed in them as in the royal dockyards, all repairs are more economically effected in the royal than in the private dockyards.

As a logical consequence of the policy explained in my memorandum on 6th December last, it has become possible to effect considerable economies in some of the dockyards outside the United Kingdom. Accordingly, those at Halifax, Esquimault, Jamaica, and Trincomalee will be reduced to cadres, on which the expenditure in time of peace will be small, but which can in time of war be at once developed according to necessity. The expenditure at Ascension will also be reduced.

In that memorandum I made no allusion to the distribution of torpedo craft, and I have now to report that in completion of their programme of redistribution it has been decided by the Board to appoint a rear-admiral in place of a captain to be in general charge of all torpedo craft in home waters under the admiral commanding the Channel fleet. At Devonport and at Portsmouth eight, and at Chatham four, torpedo-boats have been put into permanent commission, while flotillas of submarine boats are also in course of organization.

Since the commencement of the year over one hundred vessels of various classes have been successfully commissioned in reserve, and the battleships and cruisers in commission in reserve at Devonport have made their first cruise and had their first gunnery and torpedo practice at sea under the flag officer in command of that reserve squadron.

It is proposed to begin during the financial year 1905-6:

1 Battleship.
4 Armored cruisers.
5 Ocean-going destroyers.
1 Ocean-going destroyer of an experimental type.
12 Coastal destroyers.
11 Submarines.

His Majesty has approved that the battleship should be called the Dreadnought and the first of the armored cruisers the Invincible.

The sum devoted to the commencement of new ships in 1905-6 is a little over one and a quarter million pounds, and the Board have great hopes of successfully inaugurating a policy of shipbuilding by which, while fewer ships will be under construction at the same moment than has lately been the case, the period of the completion of a ship will be materially shortened from the present average of 30 to 36 months.

SELBORNE.

Speaking at Emsworth the other evening the Civil Lord of the Admiralty dealt with two points which are of considerable interest at the present juncture. He said he did not think that at any time during the hundred years that have elapsed since the battle of Trafalgar was fought and won had the British navy been so strong and so prepared for war as it is at the present moment. Moreover, while the Board of Admiralty had been able to increase the strength of the fleet, they had also effected great economies, and this result he considered to be due partly to the changed conditions of the distribution of the fleet, and partly to the lessons which we had derived from the naval campaign in the Far East. The second point upon which he touched was the new programme of construction, and he is stated to have said that the Admiralty were preparing to lay down at Portsmouth a battleship more powerful than any the world has yet seen. "In this ship would be embodied the result of the lessons learned from the war, and it was in order that these lessons might be considered and their teaching embodied in the designs of our new warships that the Admiralty had made a lull in new construction." To this he added the statement, which we take to be the official announcement of a policy which has for some time been expected to be brought into active operation, that the Admiralty would return to the practice of having all repairing work done in the dockyards.—*Army and Navy Gazette.*

From other sources come reports, meager in detail but none the less remarkable, as to the anticipated design of the Dreadnought. The displacement will not exceed 18,000 tons, says one report, although in another direction 20,000 tons has been named as the likely figure. There seems, however, to be a consensus of opinion in favor of the lower figure. Her lines are, it appears, to be very full, and her freeboard will be even higher than that in the existing battleship types. She will therefore present a larger target to the enemy, but to counterbalance this we are told she is to have an enormous battery. Eight 12-inch and ten 9.2-inch guns will be carried, the heavier pieces being mounted four in pairs in two barbettes fore and aft, and the remaining four each in a "turreted gun house" at the angles of the main deck. The 9.2-inch guns will be placed five on each broadside, but of the size and numbers of smaller pieces no information is vouchsafed. If, however, the above description be correct, it is obvious that the Dreadnought will have a most formidable broadside fire from her main armament alone, the weight of metal from each side at one discharge being 6200 lbs. It is hardly exaggeration to call such a vessel a floating fortress. No details as to the thickness of the armored protection are given, nor are the speed and horsepower mentioned, but it is evident that on the displacement these must be rather lower than has latterly been the case with battleships. At any rate, it may be judged from Mr. Lee's remarks that the "moderate dimensions" school find no warm advocates in the present Board of Admiralty.—*Army and Navy Gazette.*

The New Zealand's trials are proceeding satisfactorily, and she will be ready for the pennant very shortly. Laid down in February, 1903, only twenty-six months have been occupied in advancing her to her present state, which is practically one of completion, and that is well within the thirty months usually reckoned as the average time for the completion of a battleship. The Britannia also is progressing well, and most of her side armor is in position. The Hibernia will be launched on June 17, and the Marchioness of Ormonde has agreed to perform the naming ceremony.

With the armored cruisers also good progress is being made, the turntables and mountings for the three aftermost 9.2-inch guns of the Duke of Edinburgh have been placed in position. The armor-plating of the Warrior has also commenced, but the side armor is not yet in position.

In this connection it may be noted that Mr. Pretyman, answering Sir Gilbert Parker in the House of Commons last week, stated that in the

first four years of the present century we had laid down thirteen battleships to six by France, ten by Germany, and six by Russia. Further, in November last, we had two more authorized but not begun, to Russia's three and Germany's two; France having then no more in contemplation. Again, Germany has in view a programme involving the construction of two battleships each year from 1906 to 1909 inclusive, one each year from 1910-1916, with the exception of 1913, when, as in 1917, two will be laid down. Mr. Pretyman also announced that Russia has a programme in preparation, but that details are not known.—*Page's Weekly.*

The Pathfinder, one of the new fleet "scouts," built by Messrs. Cammell, Laird and Company, Birkenhead, has now completed her official coal consumption and speed trials. The coal consumption trial was of 96 hours' duration at a cruising speed of about 11 knots. This trial was entirely satisfactory from the point of view of economy. The vessel proved herself capable of a radius of action of about 6000 knots, which is largely in excess of the requirements of the contract. The eight hours' full power trial took place over the measured mile at Skelmorlie on Saturday, when a mean speed of 25.48 knots was obtained on the six runs on the mile, and 25.38 knots for the whole time. The guaranteed speed was 25 knots.—*United Service Gazette.*

In introducing the navy estimation before the House of Commons, Mr. Pretyman gave some information respecting the submarines. The original type of boat was 150 horsepower, and had a speed of 7½ knots on the surface. The new type is 850 horsepower, the speed 13 knots, and the radius of action 500 miles, the below-water speed being 9 knots, with 10 hours' endurance. The boats dive dynamically, not statically, and the motive power below water is electricity. There are now 13 of these new vessels, the cost of which is about £50,000 each, and there are 13 at an advanced stage of construction. They have been subjected to maneuvers of great severity, and have proved themselves thoroughly reliable. Their rôle is intended to be supplementary to the surface torpedo craft, for they will be able to do by day what the latter is intended to do by night. He considered that these boats have a considerable moral effect on the enemy. As she approached the enemy in daylight she could make sure of the character of the ship attacked before launching her torpedo. In fact the submarine might be described as a daylight torpedo-boat of moderate speed and a considerable radius of action.

In view of the debates in Parliament regarding the diminution in value of the fleet by the withdrawal of so many vessels from the active list, it may be remarked that each year a statement is prepared of the value of the ships for depreciation purposes. Armored, protected, and partially protected cruisers have 4 per cent deducted from their first cost for depreciation for each year from completion until they are 22 years old. Vessels of this class built during the past 22 years make up a value of £100,671,945, and thus over four millions is required to make good the depreciation each year. In addition there are about eight millions sterling of ships on which depreciation is no longer allowed. These have presumably been completely wiped off the balance sheet. The ships beyond 25 years of age at the anchorage do not, therefore, count for much in the national assets. In the case of the small cruisers, gunboats, etc., the case is still more favorable. The rate of depreciation allowed is 6 per cent, which is continued for fifteen years. The vessels built within fifteen years in this category make up, so far as their first cost is concerned, a total of £10,785,000—about one-tenth of the value of the larger ships, and thus the aggregate amount of depreciation per annum in their case is assumed at £647,126. Submarine and torpedo craft come within another category. The rate of depreciation is 9 per cent, and this continues for eleven years. As the vessels of this type built within eleven years cost £1,376,093, the allowance

for depreciation is £123,848. Guard, training, and harbor vessels are written down for 22 years at the rate of 4 per cent, and small craft—tugs, etc.—at 5 per cent for 18 years. The total value of the vessels built within the periods covered by the depreciation allowance is £113,659,843, and the amount required annually for replacement is thus £4,836,967. The construction vote, including armor, is more than twice this sum, so that the improvement of the fleet is steadily advancing.—*United Service Gazette.*

The official full speed trial of the torpedo-boat destroyer Garry, built by Messrs. Yarrow and Co., took place on Tuesday last. The result has been awaited with special interest, because the shape of this vessel differs considerably from that generally adopted, the after part resembling somewhat the design now common for racing motor-boats, the breadth amidships being continued nearly the full width to the stern. The counter thus extends considerably over the propellers, thereby protecting them from damage, and at the same time admitting of more commodious living spaces for the officers without exposing a greater length to gun fire. The rudder, instead of being secured to the stern as is customary, has its entire surface below the waterline, and therefore is not exposed. The keel is perfectly straight from end to end, the overhang of the stem being of such short dimensions that no special support is necessary, thus simplifying docking operations. The coal-carrving capacity of this form of hull is greater than is usual in the "River" type of destroyer to the extent of 20 tons. These advantages are obtained in combination with a diminished resistance, as the recent trial indicates, the speed attained being 26½ knots, that of other destroyers of the same class varying from 25½ to 26 knots.—*London Times.*

The full speed passage trials of the Australian squadron are not very satisfactory reading. The average speeds maintained between Wellington and Auckland were as follows:

21 knot.....	Euryalus	averaged 21 knots.
22 knot.....	Challenger	averaged 19.8 knots.
20 knot.....	Psyche	averaged 17 knots.

The ships are boilered respectively with Belleville, Babcock, and Thornycroft boilers.—*Engineer.*

TRIALS OF THE ANTRIM.—Special interest attached to the steam trials, which recently took place, of the new armored cruiser Antrim, as both the cylindrical and the Yarrow type of water-tube boilers in use work under the Howden system of draft. This arrangement, which utilizes the waste heat passing up the boiler uptake for heating the draft before it enters the furnace, is well known in the merchant service; but it is only now, so to speak, on its trial in the navy, and the results in the Antrim when in commission will be watched very carefully. So far the trial results do not show any marked saving in coal consumption in navy boiler installations generally worked under ordinary arrangements, but service conditions may be the truer test. The Antrim has in the after boiler-room six cylindrical boilers, in each of the two middle compartments six Yarrow type boilers, and in the forward room five Yarrow type boilers, making, in all 17 water-tube and six tank boilers. There are 20 fans for the forced draft, and these, with their trunks, etc., take up a considerable amount of space. The engines are of the four-cylinder triple-expansion type, now usual in the navy. All the trials were run with the vessel at her designed full load draft.

On the full power trial the Antrim realized a speed of 23.02 knots, as a result of four runs on the measured mile at Skelmorlie, the mean power being 21.606 indicated horsepower for 143 revolutions of the engines. The designed speed was 22¼ knots; and the Antrim, like the two vessels of the class already tried—the Carnarvon and the Devonshire—proves that

the speed of the class is 23 knots, a result due to improvement in the propellers. The eight hours' performance was equally satisfactory. The draft was 25 feet 2 inches. The steam pressure averaged 185 lbs., and the average revolutions for port and starboard engines were the same—142.6. The power indicated by the former was 10,627, and by the latter 10,977—together, 21,604 indicated horsepower. This is 604 in excess of the guarantee, and it was attained very easily. The coal consumption worked out to 2.26 lbs. I. H. P. per hour, and the evaporation was slightly over 8 lbs. per lb. of coal.

On the thirty hours' trial at two-thirds of the full power—regarded, because of its duration, as the most searching test of the machinery—very satisfactory results were got. On this, as on all the trials, the new Admiralty conditions were met, as regards the closing of the engine and boiler rooms, the restriction of the engine and boiler room trial staff to equal service complement, the limitation of oil used, and the entire absence of water on the engine bearings. The average power realized on the thirty hours' run was 14,628 I. H. P.; the starboard engine running at 127.8 revolutions indicated 7247, and the port engine as 127.4 revolutions 7201 horsepower. The coal consumption worked out at 1.95 lb., and the water consumption for all purposes, including auxiliary engines, at 16.48 lbs. per hour, so that the evaporation per lb. of coal was about 8½ lbs. Four runs were made over the measured mile during this trial, when the speed of the ship was found to be 21.33 knots, which for this power is satisfactory. On the trial at one-fifth of the full power the mean power developed was 4668 I. H. P. for 88.2 revolutions. The coal consumption was 2.06 lbs., and the evaporation was 9 lbs. of water per lb. of coal consumed.

The vessel, which was built by Messrs. John Brown and Co., Limited, is being completed for commission at the Clydebank yard of the firm.—*United Service Gazette.*

It has been decided to form three submarine-boat flotillas at the principal home ports, homogeneity being a feature of the scheme. The five vessels of "B" class are to form the Portsmouth division, with the gunboat Hazard as a parent ship; five of the "A" the Devonport division, with the cruiser Forth as parent ship; whilst submarines numbers 1 to 5, the first built for the British navy, will be located at Sheerness, with a cruiser (not yet selected) attached.—*United Service Gazette.*

The cruises of the fleets are assuming more than usual importance, the evolutions and practices carried out between port and port being no longer merely formal. During the recent cruise of the Channel fleet to Spanish and Portuguese waters special attention was devoted to torpedo work, a subject in which Vice-Admiral Sir A. K. Wilson is keenly interested. Torpedoes fitted with collapsible practice heads were used, and the conditions were arranged to resemble actual warfare as nearly as possible. The vessels of the fleet were directed to carry out a series of torpedo drills. Excellent work under service conditions is also being done by the second cruiser squadron, which is now on an extended cruise. Rear-Admiral Prince Louis of Battenberg is devoting special efforts to making the gunnery of the squadron exceptionally good, and on all the ships the guns' crews are busy practising. Tactical exercises for the officers are also to form part of the programme during the fleet's voyages from place to place, and on the way to Arosa Bay some maneuvers were carried out under quite unusual conditions. All the ordinary peace maneuver signals were prohibited, and the officers of watches had to "con ship" without the assistance of the revolution and speed indications usually employed. The ships kept their stations in the line by nautical observation. War conditions prevail generally with regard to signalling while maneuvers are being carried out, and on the flagship Drake the wooden bridges, which would be untenable in action, are no longer used, all signals being made from fighting positions.—*United Service Gazette.*

A correspondent with the Atlantic Fleet has sent home through Reuter's Agency details of the combined exercises which recently took place in the Levant. He writes: "Carrying out the strategic policy recently instituted by the Admiralty, which provides for the Atlantic Fleet being based on Gibraltar in readiness to strengthen either the Mediterranean or Channel Fleet as may be required for war times or peace exercises, the Atlantic Fleet left Gibraltar on April 20 for Marmarice, in Cyprus. The Mediterranean Fleet left Malta on April 24, and the two fleets met off Rhodes at noon on the 27th. Sunday was a day of rest in preparation for the work of the ensuing week, when both fleets were engaged in battle exercises at sea on Monday, Tuesday, Wednesday, and Thursday, the six admirals and two senior captains being opponents in pairs. The object of the battle exercise on the Tuesday was to maneuver the fleets so as to place them in the most advantageous position for concentrating fire in every opposing fleet; and frequent observations were taken in every ship to fix the position of the others, these observations being afterwards compared and plotted, so that the result of the action could be ascertained. When the fleets sighted each other they were steaming in line abreast, the ships being in line on each other's beam. When at about 10,000 yards range the Atlantic Fleet altered formation to line ahead, thus bringing all their big guns to bear on the approaching fleet, which then were only able to fire their bow guns. Subsequently the Atlantic Fleet altered course, so as to cross the rear of the Mediterranean Fleet, evidently with a view to crushing the rearmost ships, while being safe from the fire of the leading ships. Without the observations to guide an opinion the results cannot be judged, but a forecast might be hazarded that it was indecisive, the range (never less than 7000 yards) being too great, and the battle ceasing before the Atlantic Fleet was in position to crush the rearmost ships of the opposing fleet."—*United Service Gazette.*

THE REORGANIZED ADMIRALTY.—An Order in Council, dated August 10, 1904, issued on Wednesday, states that the Board of Admiralty is henceforth to consist of the first lord, the first and second sea lords, the third sea lord and controller, the fourth sea lord, and the civil lord. There are also to be a parliamentary and financial secretary and a permanent secretary.

The first, second, and fourth sea lords and the first lord of the Admiralty are to be responsible for the administration and so much of the general business of the navy and movements, condition, and personnel of the fleet as shall be assigned to them by the first lord. The third sea lord and controller is to be responsible for business relating to materiel, and the parliamentary and financial secretary for the finance and other business as shall be assigned to him by the first lord.

There was also issued a statement showing the present distribution of business between the various members of the Board as compared with the duties of the Board which it superseded. The duties of the new Board are set out as follows:

First lord—general direction of all business.
First sea lord—organization for war and distribution of the fleet.
Second sea lord—personnel.
Third sea lord and controller—materiel.
Fourth sea lord—supplies and transport.
Civil lord—works, buildings, and Greenwich Hospital.
Parliamentary secretary—finance.
Permanent secretary—Admiralty business.—*United Service Gazette.*

OBSOLETE SHIPS.—Mr. Arthur Lee, M. P., civil lord of the Admiralty, has just made an interesting statement in regard to the policy of the Admiralty, by which 100 ships of no fighting value have had to be struck off the navy list. As a result of the lessons learned in the present war,

he states, the policy of the Admiralty was that when a ship became obsolete not a single penny was to be spent upon it, but it was to be sold for what it would fetch, and the money devoted to useful purposes. The striking off of these ships had lessened the work in the royal dockyards, but it was intended that all repairing work should be done in those establishments. There was no intention of reducing the shipbuilding programme, though there was a lull at the present time, for the reason that, owing to the lessons learned during the war, the designs of warships have had to be considerably altered. The new designs were nearing completion, and the first of the new battleships built in accordance with them would be laid down at Portsmouth in the coming autumn.

Another fleet of obsolete ships will be offered for sale by public auction at Portsmouth Dockyard on July 11. The vessels include the armored cruiser Orlando; the cruisers Iris, Marathon, Melpomene; the gunboats Beagle, Jaseur, Pelter, Fearless, and Pincher. The Enchantress, the old Admiralty yacht, is to be sold the same day, as well as the Fancy, Hector, Myrtle, Pitt, and Raleigh.—*United Service Gazette.*

THE DEFECTIVE 12-INCH GUNS.—We hear on good authority that there is no truth in the statement that it has been decided to order new Mark IX 12-inch guns for battleships of the Majestic and Canopus classes, to replace those which are said not to be all that they should be . The policy will be to supply these gupns with new tubes where the original inner tubes have shown signs of cracking or have cracked. This is not a difficult operation, as it consists simply of taking off the breech and heating the gun and then chilling the inner tube, which, as it contracts, loses contact with the remainder of the gun, and is then hammered out. The new tube is prepared and put in the gun in the same way. It has been clearly shown by experts that when retubed the guns will be as good as new. As to fitting guns of Mark IX in place of weapons of Mark VIII this is quite impossible without almost entirely replacing the expensive mountings in the ship. The former gun is about 4 feet 6 inches longer than the latter, weighs four tons more, and, using a charge of cordite 43 lbs. heavier, develops an energy of 11,000 foot tons greater—44,622 foot tons against 33,000 foot tons. The consequence is that much heavier stresses in the mountings have to be taken up. The Secretary to the Admiralty (Mr. Pretyman), speaking at Ipswich on Saturday, declared that there was not the least danger that the guns of our fleet would not be fit for the work expected of them if the occasion of trial arose. He also denied the allegations that the Admiralty had not the reserve of guns, which they had been stated to possess.—*United Service Gazette.*

THE NEW SUBMARINES.—Submarine B 1, which is the very latest type of under-water craft adopted by the British Admiralty, embodies features and qualities in many ways quite distinct from those possessed by the old or A class. Boats of the earlier type had from 180 to 200 tons displacement, with a surface speed of 15 knots per hour and an under-water speed of 9 knots, with motive power to carry them 300 miles without restocking. The new class of B boats will be altogether bigger and more powerful. Each vessel will be of 300 tons displacement, 850 horsepower, with a surface speed of 16 knots and an under-water speed of 10 knots, and able to travel 500 miles in any direction without a recharge of motive power. In the new boats the power will be electricity supplied by accumulators, instead of gasoline, with its danger of explosion, as in the old boats. The new boats will be much heavier than those of the earlier type, and will cost £130,000 each. Ten of them are building at Barrow. The A class cost only £20,000 each.—*United Service Gazette.*

NAVAL WASTE.—The Blue-book on the Dockyard Expense Accounts of the Navy, containing the report of the auditor-general, has some rather

remarkable statements. It is pointed out that nine cruisers, which cost originally £1,476,363, and on which £165,411 has been spent in refits completed in 1902-3 and in 1903-4, have now been included in the list of vessels to be sold. Five cruisers and a gun-boat, which were refitted in the case of the former vessels in 1903-4 and in that of the latter in 1902-3 at a total cost of £283,950, have now passed into the "list of vessels available for subsidiary services," while three new vessels—the Fantome, the Merlin, and the Odin—which were completed in 1902-3 at a cost of £247,575, have also been withdrawn from effective service. On four torpedo-gunboats, which originally cost only £253,838, no less a sum than £201,533 has been spent in repairs. On the Niger, of which the first cost was £50,572, the sum of £80,620 has been expended in refitting. In the case of seven vessels which have been refitted at contractors' yards the expenditure during the year has exceeded the original estimate by £320,279. It was originally intended that the refits of two others—the Colossus and Pelorus—should be executed at the royal dockyards, but it was afterwards decided that they should be carried out in the contractors' yards, with the result that the actual carrying out of the work by contract in each case is more than double the estimate framed by the dockyards for refitting them. Two sister ships—the Albemarle and the Montagu—were built at Chatham and Devonport respectively, with the result that the total cost of dockyard work at Devonport was £31,048 less than at Chatham, the estimates being approximately of the same amount. In the case of the repairs of 14 battleships, cruisers, and special service ships the excess on repairs and refits over the estimates was £250,431.

The changes made in the design of the armored cruisers of the Devonshire class have involved an addition to the cost of about £100,000, which is equal to 12 per cent on the original estimated cost, and although the improvements are worth much, it is safe to conjecture that the ships, as finally completed, would not have cost so high a figure had the design been prepared in the first instance as it now stands. When the six vessels were ordered they were to resemble the "county" cruisers in armor, guns, and speed, but the length was increased by 10 feet to 450 feet. Soon after the placing of the orders it was decided to increase the thickness of the armor by about 30 per cent, the side plating becoming 6 inches instead of 4¼ inches. The length of the ship continued the same, but the beam was increased from 67 feet to 68 feet 6 inches, so that the extra load consequent upon the greater weight of armor would not involve any addition to the draft. At the same time, a small reduction was made on the weight allowed for machinery; and the power was reduced from 22,000 to 21,000 I. H. P., with a reduction in speed from 23 to 22.25 knots. The displacement became 10,700 I. H. P. instead of 10,500 I. H. P. These changes increased the estimated cost of each ship by from £25,000 to £35,000, as is shown by comparing the estimated cost given in the second column of the following table with that in the first column. The first is the price at the end of 1902, the second at the end of 1903, and the third at the end of 1904:

	1st. £	2d £	3d. £
Devonshire (Chatham)	———	851,576	900,792
Hampshire (Elswick)	778,362	808,445	872,327
Argyll (Scott's)	793,111	825,496	912,588
Roxburgh (L. and G.).....	764,531	792,197	863,199
Antrim (Clydebank)	810,471	839,089	899,050
Carnarvon (Beardmore) ..	784,020	812,462	879,465

Later it was decided to alter the armament. Originally it was intended to fit two 7.5-inch guns as bow and stern chasers, with ten 6-inch quick-firers. The number of 7.5-inch guns was increased to four—three forward and one aft—while the 6-inch guns were reduced to six in number. At

the same time the secondary armament was reduced. Although the cost of guns was thus slightly reduced, notwithstanding their improved effectiveness, the cost of mountings increased greatly the total cost of the ships. There were two more barbettes fitted with barbette mountings for 7.5-inch guns, and these are much more efficient than the ordinary pedestal mounting for 6-inch guns in casemates. The figures in column 3 in the table when compared with column 1 give the additional cost for the improvements effected according to official estimates.—*United Service Gazette.*

EXTRACT FROM "MEMORANDUM OF THE SECRETARY OF STATE RELATING TO THE ARMY ESTIMATES FOR 1905-1906."—CO-OPERATION WITH THE NAVY.—*Joint Maneuvers.*—The principles laid down by the Committee of Defence have been enforced, and every effort has been made to render the co-operation between the army and navy closer than before. In pursuance of this object, joint naval and military maneuvers were instituted for the first time. A force of all arms was transported by sea from Southampton to the coast of Essex, under the convoy of a squadron of H. M. ships, and a landing on the coast was effected with the aid of the navy. The operations proved very instructive, and the results have been embodied in a full report. In order that full advantage may be taken of the lessons afforded by the maneuvers, a joint military and naval committee has been appointed to study the various problems which arose in connection with the landing and embarkation.

Interchange of Officers.—An interchange of officers between the two services has taken place. Selected naval officers have been permitted by the Admiralty to attend the lectures at the Staff College, while two officers of the army have in their turn attended the war course at the Royal Naval College, Greenwich. It is believed that this interchange will be of value to both services, and will lead to further developments in the same direction.

Submarine Mines.—In November, 1903, a proposal was made to the Admiralty to the effect that the War Office should hand over to the navy the whole of the submarine mines and their appliances in the naval ports; that similar transfer should take place in naval ports abroad, when a sufficient number of submarine boats was available to protect passages now closed by submarine mines, and that the submarine defences in the home ports, other than naval ports, should be abandoned by the army as soon as the Admiralty could supply an alternative defence.

These suggestions have been discussed by the Committee of Imperial Defence, and the Admiralty has now agreed to adopt the course proposed. The transfer in the naval ports has already taken place, the submarine mines, launches, and plant generally having been handed over to the navy. At the request of the navy, however, the whole of the gun defences and electric search-lights are still retained by the army.

Exchanges between War Office and Admiralty.—In exchange for the submarine mining launches and plant received from the army, the navy have undertaken to place a large number of guns and ammunition, rendered available by the laying up of obsolete ships, at the disposal of the army. A considerable number of these guns will be of value for purposes of defence and practice.

ENGLAND'S MEANS OF DEFENCE.—London, May 11.—In the House of Commons to-day Premier Balfour, in a remarkable speech with reference to the work of the Committee on National Defence, discussed the precautions that had been taken for the defence of the coasts and the possibilities in case of invasion. He spoke with an openness seldom surpassed.

He said that, assuming that the British army was absent upon an oversea expedition and the organized fleets were away from home, it was the opinion of Lord Roberts and other military advisers that it would not be possible to make an attempt to invade this country with less than 70,000 men. To attempt to take London, Lord Roberts thought, would be a forlorn hope, even if the 70,000 men did reach London.

Now, with the fleet absent and the military defences in the state he had described, was it possible to land 70,000 men on these shores? In stating the problem in that way they avoided all consequences raised by what was called the "blue water school."

The latter assumed that there were no land defences. The difficulty of invasion depended upon the number of men to be landed. Ignoring the "blue water school" and assuming that a small body of soldiers was here, an unorganized body with some knowledge of arms, the enemy would require 70,000 men.

Since the old days of Wellington and Nelson there had been great scientific changes, all of them in favor of defence. For instance, there were steam and wireless telegraphy. There were also torpedo-boats and submarines.

"No British admiral," said Mr. Balfour, "would view with serenity the disembarkation from battleships and other ships of 70,000 men on a coast infested by torpedo-boats and submarines. Let the committee consider whether under the conditions named it would be possible to land 70,000 troops on this island. The invaders must have transports.

"Take a friendly illustration. Take France. Before invasion there must be long and open preparation. On a particular day last year there were about 100,000 tons of shipping in the Channel and Atlantic French ports. That would be absolutely insufficient to carry 70,000 men.

"The Admiralty held that 250,000 tons would be required. Some thought that estimate too high. In any case 210,000 tons would be required. It was no simple matter to collect transports to that extent. The nearest harbor that France has is Cherbourg, and it is a very bad harbor.

"Meanwhile, from the Faroe Islands to Gibraltar we should be collecting our cruisers, destroyers, and submarines. When the French fleet arrived the disembarkation of 70,000 men, with our fleet off the coast between Dover and Portsmouth, would not be very easy.

"Nobody would put the time at less than forty-eight hours—two days and two nights. It would also require fine weather. How is it possible that these helpless transports could possibly escape our torpedo-boats, putting out of consideration anything our cruisers and torpedoes could accomplish?"

The thing, Mr. Balfour said, was impossible. The enterprise was not one a sane nation would undertake. There was no admiral in the British Fleet who would undertake a task like that. Not merely the transports, but the enemy's fleet itself would suffer, unless naval officers had greatly overrated the efficiency of torpedo craft and submarines.

Regarding India, the progress of Russia toward the Afghan frontier and the construction of strategic railways had compelled the government to consider in all seriousness what could be done by England's great military neighbors in the East. No surprise or rush, however, was possible.

If England permitted the slow absorption of Afghanistan and allowed Russia's strategic railways to creep closer and closer to a frontier which she is bound to defend, then this country would not only inevitably have to pay for its supineness by having to keep afoot an army far larger than could be contemplated with equanimity, but would sooner or later be faced with some of the greatest military problems which had ever confronted the British Government. Foresight and courage were the great needs.

Mr. Balfour, continuing, said that, as to colonial defence and having regard to the changes in the sea power of other nations, the redistribution of the fleet and army was desirable. The committee consequently proceeded on the broad line that the British fleet and army should be available for the defence of the empire in all parts of the world, and should, as far as possible, be concentrated at the center of the empire, from which it could be distributed as necessity arose. The committee had come to the conclusion that Jamaica and Trinidad would be centers of great naval operations.—*New York Sun.*

THE FLEET REDISTRIBUTION. MEMORANDUM BY THE FIRST LORD OF THE ADMIRALTY.—In continuation of my memorandum of 6th December, 1904 (Navy—Distribution and Mobilization of the Fleet), I have now to announce that the changes there foreshadowed, so far as the lapse of time has permitted, have been made operative by orders recently issued.

2. These changes, which have been completed or are in course of completion, comprise:

a. Increase of the Channel (late Home) fleet to 12 battleships.

b. Reconstitution of the late Channel fleet as the Atlantic fleet, with its permanent base at Gibraltar, under the command of a commander-in-chief.

c. Constitution of the first cruiser squadron, affiliated to the Channel fleet, and of the second cruiser squadron, affiliated to the Atlantic fleet, and each consisting of five armored cruisers, to be increased in the near future to six armored cruisers.

d. The abolition of the South Atlantic squadron.

e. The reconstitution of the Mediterranean fleet with eight battleships, and the constitution of the armored cruisers attached to the command as the third cruiser squadron.

f. Arrangements for the repairs of the Channel fleet to be carried out at the home dockyards, and those of the Atlantic and Mediterranean fleets at Gibraltar and Malta respectively.

g. The constitution of the particular service squadron, under the command of the commander-in-chief, North America and West Indies station, composed of the flagship on that station, and the five sea-going training-ships for cadets, youths, and boys. This forms the fourth cruiser squadron.

h. The establishment of the system of commissioning all sea-going ships of the fighting line at the several home ports with nucleus crews, with a rear-admiral in command at each port, so as to enable them to proceed to sea either singly or in squadrons at a few hours' notice.

N. B.—The squadron of nucleus crew ships at Devonport and Portsmouth have already completed their first cruise in the Channel with most satisfactory results.

i. The substitution of modern cruisers for the older vessels recently acting as schools for navigation or as tenders to the gunnery schools.

j. The withdrawal from commission of vessels of comparatively small fighting efficiency.

3. Consequent on the above redistribution, further orders have been issued for regulating the cruises and maneuvers of the various fleets and squadrons.

4. These orders have been based on the principle, to which great importance is attached, that the fleets and squadrons everywhere should, as far as possible, be kept together as a whole, and ready at any time for instant action.

5. The advantages of such a system are manifest, but if carried out to the extent that a battleship or large cruiser, whether at anchor or under way, is never to be out of the sight, and therefore never out of the immediate control of a flag officer, there is danger of destroying the spirit of initiative and originality on the part of the individual captains.

6. It has therefore been laid down that at one period of the year, as may be convenient, the larger ships of each fleet may be separated for a few weeks by twos or threes in adjacent anchorages, where the respective captains may have the opportunity of carrying out independently any exercises they may desire to practice both at anchor and under way.

7. In pursuance of the general principle, orders have further been given that, as a rule, not more than one large vessel of a fleet or squadron is to be under repair in dockyard hands at one time, so as to ensure the various fleets and squadrons being kept always at their effective strength and ready for instant service. Each ship whilst undergoing her annual refit will take that opportunity of putting the crew through the annual musketry

course and through such torpedo course in the way of practice and lectures, etc., as may be found desirable.

GIBRALTAR AND THE LIMITS OF THE MEDITERRANEAN STATION.

8. Gibraltar having been constituted the permanent base of the Atlantic fleet, involving the frequent presence there of the commander-in-chief of that fleet, it was felt that to retain it as an integral part of the Mediterranean command would result in the establishment of a species of dual control over the personnel at Gibraltar, which could hardly fail to lead to complication and delay in the conduct of business at the port. It has therefore been judged expedient to separate it from the Mediterranean station in peace time, and to place it under the immediate control of the commander-in-chief who will be generally present, and who will depend upon its dockyard for the repairs to his fleet. In war time it will revert to the Mediterranean station.

9. The limits of the Mediterranean station on the west, which at present extend into the Atlantic to the 10th degree of west longitude, have consequently been reduced, and the western boundary will henceforward be the 5th degree of west longitude, or about 16 miles to the east of Point Europa.

10. It is not proposed to give any geographical sphere to the Atlantic fleet, which, being permanently stationed in the vicinity of Gibraltar, will naturally attend to any diplomatic or other work within reach of that place. Its cruising ground will extend into the western basin of the Mediterranean, inclusive of the west coast of Italy, the coast of Sicily, and Cape Bon, and in the Atlantic it will extend to the north as far as Cape Finisterre, and to the west and south up to, and inclusive of, the Azores and the Canary Islands.

CRUISES AND MANEUVERS OF THE FLEETS AND SQUADRONS.

11. The Atlantic fleet will carry out combined maneuvers with the Mediterranean fleet twice a year, at the end of April and at the beginning of August, and once a year with the Channel fleet in February, and the period occupied in each of those meetings will not be less than 7 nor more than 14 days, exclusive of the days of meeting and parting.

12. Between the dates of these combined maneuvers the three above-mentioned fleets will carry out individual cruises and exercises, either in their own particular areas or in the adjacent waters, except in the months of June and July.

13. In the two last-named months the general maneuvers referred to in my previous memorandum will take place annually.

CRUISER SQUADRONS.

14. As already stated, the first and second cruiser squadrons have been attached to the Channel and Atlantic fleets, but they will from time to time make independent cruises, with the object of showing the flag at the principal ports on the coasts of the Atlantic Ocean. These cruises will, as a rule, each occupy about two months.

15. The third cruiser squadron will remain in the Mediterranean under the orders of the commander-in-chief, and will be regarded and worked, so far as practicable, as a complete unit in conjunction with the destroyer flotilla, which has been affiliated to it.

16. The fourth cruiser (particular service) squadron, which comprises the flagship of the vice-admiral in command of the North America and West Indies station, and the several sea-going training-ships, will make three cruises annually in the West Indies and in home and adjacent waters, returning home after each cruise at the dates fixed for changing the classes under training.

17. Under this arrangement it is estimated that the fourth cruiser squadron will be cruising for 30 weeks, and will be at home for 22 weeks.

TORPEDO CRAFT FLOTILLA IN HOME WATERS.

29. A rear-admiral has been appointed to command all destroyers, torpedo-boats, and submarines in full commission, and also those in commission in reserve in home waters. He will fly his flag in the new fast cruiser Sapphire, with headquarters at Portland.

30. The torpedo-boats and submarines at the home ports, so long as they are based on those ports, will, however, remain under the supreme control of the respective commanders-in-chief, as at present.

31. The stationary destroyer depôt-ships Erebus, Fisgard, and Tenedos having been appropriated for the purpose of training boy artificers, their place has been taken up by the old first-class cruiser Impérieuse, which will be stationed at Portland as tender to the Sapphire, and will be known as Sapphire II.

32. Pending the completion of the destroyer base at Sheerness, and of the harbor works at Dover, the 24 destroyers in the three sea-going flotillas have been concentrated at Portland as tenders to the flagship Sapphire.

TORPEDO CRAFT FLOTILLA ATTACHED TO THE ATLANTIC FLEET.

33. H. M. ships Leander and Tyne will be placed under the orders of the commander-in-chief of the Atlantic fleet as depôt-ships for the destroyer and torpedo-boat flotillas attached to his fleet, which will comprise the following:

10 destroyers in commission with full crews.
8 destroyers, 12 first-class torpedo-boats, } In reserve at Gibraltar. Commissioned with nucleus crews.

TORPEDO CRAFT FLOTILLA IN THE MEDITERRANEAN.

34. The rear-admiral commanding the third cruiser squadron will be immediately responsible to the commander-in-chief for this flotilla equally with the squadron. H. M. S. Vulcan will act as depôt-ship for the flotillas. The number of torpedo craft attached to the Mediterranean fleet will be as follows:

15 destroyers in commission with full crews.
7 destroyers, 9 first-class torpedo-boats, } In reserve at Malta. Commissioned with nucleus crews.

TORPEDO CRAFT FLOTILLA ON THE CHINA STATION.

35. The Hecla will shortly proceed to China as a depôt-ship for the torpedo craft on the station, which will comprise the following:

6 destroyers in commission with full crews.
2 destroyers, 4 first-class torpedo-boats, } In reserve at Hong Kong. Commissioned with nucleus crews.

36. The Board are well aware that these changes have sometimes entailed considerable inconvenience on those concerned in them, but they were necessary for the good of the service, and the Board are glad to take this opportunity of expressing their cordial appreciation of the thoroughly efficient and loyal manner in which they have been carried out by all ranks and ratings of His Majesty's Navy.

March 15, 1905. SELBORNE.

ITALY.

VESSELS BUILDING.

Name.	Displacement.	Where Building.	Remarks.
Battleships.			
Roma	12,625	Gov't Yard, Spezia.	Building.
Napoli	12,625	" " Naples.	"
Vittorio Emanuele	12,625	" " Castellamare.	Launched October 1, 1904.
Regina Elena	12,625	" " Spezia.	" June 19, 1904.
Armored Cruiser.			
San Giorgio	9,000	Gov't Yard, Castellamare.	Building.
B	9,000	" "	Projected.

THE NAVAL PROGRAMME.—The Italian estimates for the years 1905-1906 contemplate the construction of a variety of ships, some of which are sure to attract the attention of naval experts. The following information, based on official reports, illustrates the points of greatest interest of the new programme. The figures given in brackets, for every ship or group of ships, represent the percentage of completion of that vessel or class at the end of the financial year 1905—June.

The 1905-1906 estimates comprehend:

(1) Construction of four battleship-cruisers—Vittorio Emanuele (47), Regina Elena (66), Roma (18), Napoli (31).

(2) Construction of two armored cruisers, A (4) and B, the first building, the second to be built at Castellamare.

(3) Outfitting of the two transports Sterope (100) and Bronte (100).

(4) Construction of a ship C, for blockading services, to be built at Venice.

(5) Fifteen torpedo-boats, building—four at Genoa (40), four at Naples (55), six at Elbing (65), and one at Spezia (30); twelve torpedo-boats projected (10).

(6) Five submarines, submersibles—Glauco (90), Squalo (60), Narvalo (60), Otaria (30), Tricheco (30).

(7) Two coast defence gunboats (20).

(8) Two tank vessels, Crati (100) and Simeto (100), building at Venice.

(9) Three tug-boats, and other vessels of minor importance.

The estimated cost for some of these vessels is:

Vittorio Emanuele and class	£1,200,000 each.
Armored cruisers A and B	880,000 each.
C	480,000
Submarines	30,000 each.
Bronte and Sterope	109,000 each.

The total cost of the ships contemplated in the naval programme will be £8,409,628.

The battleships of the Vittorio Emanuele type have been described and illustrated in almost all technical publications, but something remains to say of another type of warship contained in the latest estimates. The armored cruisers A and B have been projected by General Masdea, one of the most capable Italian naval constructors. The following are their principal characteristics:

Displacement, 9600 tons; speed, 22½ knots; indicated horsepower, 18,000; length between perpendiculars, 430 feet; length over all, 455 feet; breadth, extreme, 69 feet; draft, mean, 23⅓ feet. Coal supply—normal, 700 tons; maximum, 1500 tons. Armor (Terni plates, figure of merit 27)—belt, amidships, thickness, 7⅞ inches; citadel, 7⅛ inches; circular redoubts, 6½ inches. Armament: Artillery—four 10-inch guns, 45 calibers, in two double turrets; eight 8-inch guns, 50 calibers, in four double turrets; sixteen 3-inch guns, behind shields; eight 3-pounders. Torpedo tubes—two broadside, above water; one astern, submerged.

An original feature of Italian design, the tendency to combine in one fighting unit the military qualities of a battleship with those of cruising ships, may be observed also in these two armored cruisers. In fact, if the Vittorio Emanuele is a battleship having the speed of a cruiser, A and B are two cruisers with battleships' armament. The artillery which is to be carried by these armored cruisers will confer on them a decided superiority, as far as offensive power is concerned, over all other vessels of their class and size, building or projected. Six-inch guns, which were adopted for the Garibaldi, Saint Bon, and Sardegna types, are now regarded as obsolete by Italian naval constructors, and have not been mounted on any of the new ships. Other countries, it seems, are also coming to the con-

clusion that 6-inch is an expiring caliber, and that even for armored cruisers no gun between the 10-inch or 9.2-inch guns and the anti-destroyer artillery ought to have a place. One of the main qualities of the new cruisers, their speed of 22.5 knots, can only be profitably discussed when it has actually been attained at trials. The estimates, though very sanguine in this respect, are quite trustworthy, considering that Italian naval constructors, when deciding on the power of ships, adopt methods founded on model experiments, which have seldom led to serious errors. If A and B, therefore, come up to the expectations of their designer, they will possess, on a whole, tactical and strategical qualities not inferior to those of the latest British types of armored cruisers, such as the Warrior class, of 13,500 tons. Their protection will defy penetration by the guns on most of the less modern armored cruisers, and they will have the advantages over ships of the Cressy, Drake, and Devonshire classes, or the American Charlestons, the German Fürst Bismarck, and the French Marseillaise, of being able to choose the range at which they will engage in an artillery duel. For the present, owing to the lack of further information, it is not possible to examine the distribution of weights, which has enabled the Italian constructors to meet so many requirements with a comparatively small displacement.

The task of protecting with 7⅛-inch plates a 10,000-ton vessel, which has to carry an armament equal, if not superior, to that of the Renown or Centurion, and getting 22½ knots out of this vessel, is not easy, and if it is accomplished the fact will be worthy of much consideration by those who follow the progress of naval architecture.—*Engineer.*

The trials of the Regina Margherita have been completed with fairly satisfactory results. On her first trial at 14,000 horsepower she attained a speed of 19.3 knots, and later with 20,600 horsepower the speed was 20.2 knots. It will be noted that for an increase in power of nearly 50 per cent the increase in speed was slightly less than one knot, and this is a matter the Italian authorities might well give attention to. With some of our county cruisers, a rather similar experience occurred, and it was not until the propellers had received attention that the vessels were able to give such excellent performances as they are now capable of. The Regina Margherita's boilers are of the Niclausse type.—*Page's Weekly.*

JAPAN.

VESSELS BUILDING.

Name.	Displacement.	Where Building.	Remarks.
Battleships.			
Kashima	16,800	Elswick.	Launched Mar. 22, 1905.
Katori	16,800	Vickers.	Building.
Armored Cruisers.			
1	12,000	Kure.	Building.
2	"	"	"
3	"	"	Projected.

A NEW JAPANESE BATTLESHIP.—The Japanese battleship Kashima, which was launched at Elswick on March 22, is a vessel of very remarkable character, and one of the most powerful battleships afloat. She has a displacement of 16,400 tons, and is 455 feet long, with 78 feet beam and 26 feet 8 inches draft. Fully equipped, the vessel will exceed 17,000 tons, and her great size has made it advisable to provide her with two docking keels on the flat portions under the bilges amidships. She carries the very powerful armament of four 12-inch guns in her two main barbettes, four 10-inch guns singly in barbettes, twelve 6-inch guns in the citadel, twelve 12-pdrs., three 3-pdrs., six Maxims, and five torpedo-tubes. The armament has been so placed as to ensure that one gun will not interfere with another in firing, and every gun has a considerable arc of training. The

protection is very efficient, the armor amidships being carried from the water-line to the upper deck with 4-inch screens rising 7 feet 6 inches higher, and covering the 6-inch gun positions amidships as well as the spaces between the 10-inch gun positions. The main armor belt extends the whole length and is 9 inches thick amidships, tapering slightly to the extremities. It extends 5 feet below water and 12 feet 6 inches above, while the side plating on the higher level is 6 inches thick amidships, with 6 inches of steel for the citadel. Here are ten 6-inch guns separated by screens, and firing through ports similar to those in casemates. The other two 6-inch guns are on the upper deck amidships, behind the 4-inch screen which has been alluded to. The 12-inch barbette armor varies from 9 inches to 5 inches, while the 10-inch barbettes have 6-inch armor. Several protected positions for officers have been provided, there being, in addition to the conning tower, an observer tower, and two shelters on the boat deck amidship. The steel protective deck is 2 inches thick on the flat and 3 inches on the slopes which go down to the bottom of the main armor deck. For further protection of the ship's company there is thick protective plating worked on the top of the screen armor at the level of the boat deck. The ship is provided with twenty Niclausse boilers, and the speed is to be 18½ knots. She will have two large steel masts, each having searchlights and gun-controlling platforms. Helm indicators are provided and there will be an elaborate installation of telegraphs, voice pipes, and telephones. The complement of the ship will be about 980 officers and men. The launching weight was about 8000 tons, and the ship has been in hand since February, 1904.—*Army and Navy Gazette.*

The battleship Kashima, launched at Elswick on March 22 by Madame Arakawa for the Japanese navy, was ordered before the authorities at Tokio had been able to make any deductions from their series of successful attacks upon the Russian ships. Indeed, the designs were laid down before hostilities broke out, although that order was not formally signed till some time after the first and decisive stroke, which paralyzed the Czar's fleet at Port Arthur. It has not been possible, therefore, to give effect in this ship to the lessons learned by the close study of the ships now lying derelict in the captured port. Some modifications, however, have been made in detail, notably in the direction of strengthening the walls of the magazines against explosions of shells in the interior of the hull and in the provision of a strong inner skin-plating to counteract the explosion effects of torpedoes and mines.—*United Service Gazette.*

NEW JAPANESE WAR VESSELS.—According to Japanese advices the construction of an armored cruiser at the Kure navy yard in Japan is progressing rapidly and it is expected that the vessel will be in commission by the end of the year. She is a 12,000-ton craft. A sister ship to the cruiser was started last March when her keel was laid, and will be launched March or April of next year. Two more cruisers will be built after their completion. The destroyer Fubuki of 380 tons, which was launched on January 2, will be in commission in May, and three other destroyers now under construction will be in commission in July or August of this year.—*Nautical Gazette.*

JAPANESE HOSPITAL-SHIPS.

(By DR. GEORGES VARENNE, Surgeon of the French Navy. Translated from the *Archives de Médecine Navale* by Fleet Surgeon C. MARSH BEADNELL, R. N.)

In the course of her present military operations, Japan is utilizing a system of removing the sick and wounded, the organization and *modus operandi* of which are well worth the attention of all who appreciate the indispensability of such a service in modern warfare.

The removal of the sick and wounded from the scene of action to the Japanese hospitals is undertaken by two bodies:

1. The medical department of the Japanese navy.
2. The Japanese Red Cross Society.

STATE HOSPITAL-SHIPS.

The State employs two hospital-ships, the Kobé-Maru and the Saïko-Maru. These two sister-ships are of English construction, have a displacement of 3000 tons, and a speed of 15 knots.

They sail under the Japanese mercantile flag, and fly the Geneva Red Cross at the main-mast. These vessels, which in peace time belong to the great Nippon Yusen Kaisha Steamship Company, are, in times of war, provided with a special complement; they retain their own staff and merchant crew for the purpose of navigating the ship and carrying on the daily routine in connection with it; but they receive in addition a medical *personnel* thus composed:

Personnel.—One principal medical officer (gouni-sho-kan); one fleet surgeon (gouni-daï); one staff surgeon (gouni-tchu); three surgeons (gouni-sho); two assistant surgeons (gouni-kohoscï); two dispensers (yakous); thirty sick-berth attendants.

On board these ships there are no women-nurses, whereas the Red Cross hospital-ships, which we will describe further on, are supplied with a greater number of female than male nurses.

Arrangements.—Sick and wounded officers are quartered in rooms, each containing, as a rule, two bunks. Ordinary cases are placed in bunks, supported by iron braces and arranged one above the other in two rows, on large and well ventilated decks. The bulkheads are covered with a paint called *Japonaise*, which can be washed with boiling water. In addition to these quarters, there is a room set apart for the isolation of infectious cases, and a cabin for mental cases.

All these compartments occupy the after-portion of the deck, and a fraction of the mid-ship portion. Forward, are situated the quarters of the nursing staff, a steam laundry, a large disinfecting stove, and a freezing chamber. In the central part of the deck will be found the operating theatre and dressing room, both well lighted by large port-holes. The walls are coated with white enamel, the instruments are of the latest and best pattern.

Close to the operating theatre is a laboratory, completely equipped for radioscopy and sciagraphy. Constant use of this laboratory has been made since the outbreak of the war, and we need not insist upon the innumerable services, which, in several circumstances, radioscopy has rendered to surgery.

Upon the upper deck is situated the laboratory of pathological anatomy and bacteriology, a well lighted chamber containing a very complete stock of instruments, also microscopes of French or German make. Finally, upon this deck are the officers' quarters, ward room and accessory rooms (spirit and provision rooms, kitchens, etc.). The store-rooms and other compartments, having no particular bearing on this subject, need no description.

The Sick and Wounded.—A hospital-ship of this type is able to receive a maximum number of sick and wounded as follows: Officers, 30; ordinary cases, 200; infectious cases, 80.

The sick are kept in a condition of irreproachable cleanliness, and are fed in a manner that differs but little from the feeding of the sailors of the Japanese Navy, except, of course, in the case of those on special diet. The State hospital-ships have been in constant use since the commencement of the war, and the surgeons of the Japanese navy are unanimous in extolling both their utility and their splendid organization. They attribute to these sources of immediate medical relief the very considerable lowering in the percentage of mortality amongst the sick and wounded of their

armies. They are furthermore aided to a considerable degree in their arduous task by the hospital-ships of the Japanese Red Cross Society, concerning which we shall now say a few words.

JAPANESE RED CROSS.

Twenty-eight years ago, in the course of the civil war, some Japanese philanthropists founded, for the purpose of aiding the wounded, a society which ultimately adopted the articles of the Geneva Convention and became known as the Japanese Red Cross Society. At the present time this society has been brought up to the highest pitch of organization. It is placed under the honorary directorship of Prince Kiven-In, and under the effective presidency of Count Sano. Its members are divided into four categories:

1. Members who have given a donation of 1000 yen to the society.
2. Members who have given a donation of 250 yen to the society.
3 and 4. Members who have given a donation of 25 yen to the society, or an annual subscription of three yen for ten years.

Members of the different classes are granted medals and distinctive badges; foreigners are permitted to join the society. The total number of members, which 28 years ago amounted to 38, is at the present time 920,000. The total capital is 7,900,000 yen; the total annual assessments are 2,310,000 yen. The sanitary departments of the society are subdivided into 110 companies, each company comprising 4 surgeons and 40 male and female nurses. The total *personnel* employed by the Japanese Red Cross in ambulance and health departments on board ship, is 3099, of whom 1886 are female nurses, and 750 male nurses. The society has, in addition, founded 320 university scholarships, to enable young men of scanty means to prosecute their medical or pharmaceutical studies, on the understanding that they are afterwards enrolled in the Red Cross corps. The Japanese are justly proud of the good services rendered by this society. Foreigners, who have recently been to Japan, and who have seen the ambulances organized by it, declare that the sick in them meet with admirable treatment.

Red Cross Hospital-Ships.—Two hospital-ships, the Hakuaï-Maru and the Kosaï-Maru, are, at the present time, employed by the Japanese Red Cross Society.

These vessels, which also belong to the Nippon Yusen Kaisha Company, have the same characteristics and almost the same internal economy as the Kobé-Maru and the Saïko-Maru. It has, nevertheless, been stated by a Japanese army surgeon, who has seen and compared the two services, that the State vessels are to be preferred. Be that as it may, the Red Cross hospital-ships have already given a good account of themselves in the Chino-Japanese war.

In the course of the operations now going on, they have rendered yeoman's service in carrying on an almost continuous to-and-fro transport between the military bases and the hospitals in Japan.

We had the opportunity of paying a visit to the Hakuaï-Maru at Chemulpo, on 2d March, 1904, when she came to that port for the purpose of removing some wounded from the shore-hospital to the Japanese hospital at Matsuyama. The ship was exquisitely clean, and the work was carried on without a hitch.

The wounded Russians, some of whom were in a most critical condition, were looked after with the greatest care.

The *personnel* of the Red Cross hospital-ship includes: One fleet surgeon, two surgeons, two assistant surgeons.

The Foreign Office appoints an officer to be in charge of the administration, and probably, of the actual management of these vessels.

Lastly, 40 male and female nurses do the work of the wards.

The navigation and care of the ship are entrusted to the complement she possessed in peace time. These ships, which in March came to Chemulpo to fetch away the sick and wounded, have, since then, skirted the coast line, working hand-in-hand with the army.

The naval hospitals, into which the different ships discharge their wounded, are situated at Matsuyama, Yokosuka, Kuré, Sasebo, and Maïzuru. These hospitals belong to the medical department of the navy; the medical officers were formerly trained in a special school, but are now chosen from amongst those medical men who have first studied in Japan and afterwards graduated in England or Germany.—*United Service Institution.*

RUSSIA.

VESSELS BUILDING.

Name.	Displacement.	Where Building.	Remarks.
Battleships.			
Emperor Paul I.....	16,000	St. Petersburg (Baltic Yard).	Building.
Andrei Pervosvannui.....	16,000	St. Petersburg (Galerney Island).	"
Slava.....	13,516	St. Petersburg.	Launched Aug. 29, 1903.
Evstafi.....	12,500	Nicolaiev.	Building.
Ivan Zlatoust.....	12,500	Sevastopol.	"
Coast Defence Iron Clad.			
Admiral Boutakof	6,000	St. Petersburg.	Building.
Protected Cruisers.			
Kagul	6,750	Nicolaiev.	Under trial.
X.....	6,700	"	Building.
Otchakof.....	6,750	Sevastopol.	Under trial.
X.....	6,750	"	Building.
Vitiaz.....	6,750	St. Petersburg.	"
X.....	6,750	"	"
Kalgoula.....	3,200	Nicolaiev.	"
?.....	3,200	Danzic (Schichau).	"
?.....	3,200	St. Petersburg.	Projected.

The fate of the three small battleships built by the Terni Trust as a speculation has now apparently been settled by the purchase of them by Russia. They cannot, of course, be delivered until the war is ended, but they will then do something to balance the Kashima and Katori which are building in this country for Japan. The fact of the sale of the three vessels (which it was once understood were for the Italian navy) has been kept very secret, and it does not appear that any official announcement of the transaction is to be expected while the war continues.—*Page's Weekly.*

It is announced that a number of Russian naval officers have arrived at the Chantiers de la Seyne, near Toulon, in order to supervise the construction of two armored cruisers, twelve destroyers, and a certain number of torpedo-boats and submersibles, which are to be constructed there. The machinery will be built at the works of the Forges et Chantiers, at Marseilles. It is understood that Admiral Gregorovitch will have charge of the business arrangements. A recent order of the Russian Emperor is said to authorize the building of three cruisers of the Bayan class, four gunboats of the Gilyak class, ten smaller gunboats of 183 tons, two mining cruisers of 570 tons, two large destroyers, and some auxiliary vessels. It seems likely, as a result of Mr. Schwab's visit to St. Petersburg, that several Russian battleships will be built in United States private yards, and a design for a very powerful type has been presented to the Russian Admiralty.—*Army and Navy Gazette.*

UNITED STATES.

VESSELS BUILDING.

No.	Name.	Speed. Knots.	Where Building.	Per cent. completed May 1, 1905.	Per cent. completed June 1, 1905.
	Battleships.				
13	Virginia	19	Newport News.	85.53	87.36
14	Nebraska	19	Moran Bros. Co.	70.89	72.4
15	Georgia	19	Bath Iron Works.	77.78	80.01
16	New Jersey	19	Fore River Shipbl'g Co.	81.1	84.8
17	Rhode Island	19	Fore River Shipbl'g Co.	86.	87.6
18	Connecticut	18	Navy Yard, New York.	73.56	77.73
19	Louisiana	18	Newport News.	74.83	77.55
20	Vermont	18	Fore River Shipbl'g Co.	47.2	51.1
21	Kansas	18	New York S. B. Co.	51.4	54.
22	Minnesota	18	Newport News.	63.18	65.42
23	Mississippi	17	Wm. Cramp & Sons.	27.04	29.09
24	Idaho	17	Wm. Cramp & Sons.	24.93	27.19
25	New Hampshire	18	New York Shipbl'g Co.	3.2	7.2
	Armored Cruisers.				
5	West Virginia	22	Newport News.	100.	
6	California	22	Union Iron Works.	75.	78.2
8	Maryland	22	Newport News.	99.95	100.
9	South Dakota	22	Union Iron Works.	72.9	74.
10	Tennessee	22	Wm. Cramp & Sons.	71.80	73.23
11	Washington	22	New York Shipbl'g Co.	74.2	76.3
12	North Carolina	22	Newport News.	3.25	6.08
13	Montana	22	Newport News.	3.20	5.22
	Protected Cruisers.				
20	St. Louis	22	Neafie & Levy Co.	63.	65.3
21	Milwaukee	22	Union Iron Works.	72.4	73.8
22	Charleston	22	Newport News.	93.78	94.98
	Gunboats.				
17	Dubuque	12	Gas Engine & Power Co.	94.28	96.4
18	Paducah	12	Gas Engine & Power Co.	83.9	85.4

THE NEW SCOUTS.—The general dimensions and features of the three scout ships are as follows: Length between perpendiculars, 420 feet; breadth molded, 46 feet 8 inches; displacement on speed trial, not more than 3750 tons; mean draft to bottom of keel at trial displacement, not to exceed 16 feet 9½ inches; total coal bunker capacity, about 1250 tons; coal carried on speed trial, 475 tons; feed water carried on speed trial, 90 tons.

Each vessel will be provided with a battery of twelve 3-inch rapid-fire guns and mounts and two submerged torpedo-tubes.

The engines under the Department's plans will be of the vertical twin-screw four-cylinder triple expansion type, of a combined indicated horsepower of 16,000, and arranged for outboard turning propellers when going ahead. The steam pressure will be 250 pounds in the high pressure receiver. The stroke will be three feet. The cylinder diameters will be sufficient for the required indicated horsepower at about 200 revolutions per minute. Each engine will be located in a separate water-tight compartment. There will be 12 water-tube boilers, placed in three water-tight compartments. The boilers will be of the Express type and as approved by the Bureau of Steam Engineering. Each vessel will be provided with a general workshop, equipped with two lathes, one shaper, one upright drill

press, one universal milling machine, one combined hand punch and shears, one emery grinder, three bench vises, one blacksmith's forge and tools, etc. —*Iron Age.*

The final papers in the contracts for building the new scout cruisers Birmingham, Chester, and Salem, have been signed at the Navy Department. The Fore River Shipbuilding Co. will build one of the cruisers with reciprocating engines, following the Department's plans altogether, and the other ship with Curtis turbines, making such modifications as will be required by fitting the ship with this propelling machinery. Slight modifications will also be made in the Department's plans for the ship to be built at the Bath Iron Works, but only such as are required in equipping the vessel with Parsons turbines of the four-screw type. The citizens of Salem, Mass., are already at work raising money to present the ship that is to be named after that town with a silver service.

The Fore River-built craft will cost the Government $1,665,000 each, and the one awarded to the Bath Iron Works, of Bath, $1,688,999.—*Nautical Gazette.*

The electrical generating equipment of the new battleships Mississippi and Idaho, now building at the yard of the Wm. Cramp & Sons Ship & Engine Building Company, Philadelphia, will consist of eight 100-kw. units operated at 125 volts, and arranged in two dynamo rooms. The electrical installation on the ships will be very complete, including motors operating on the Ward-Leonard system to drive the six big turrets for the 12-inch and 8-inch guns, ammunition hoists for these guns as well as the smaller ones; conveyors for transferring ammunition from the magazines to the hoists; boat cranes and winches, and all blowers except those used for the production of forced draft. In addition a very complete system of telephones, call bells, buzzers, gongs, annunciators, engine and steering telegraphs, and revolution and rudder indicators will be installed. —*Iron Age.*

ORDNANCE AND GUNNERY. TORPEDOES.

REMARKABLE RECORD IN GUN FIRING.—From the Asiatic station come in private letters remarkable tales of target firing on the battleship Wisconsin. Training her batteries across the smooth waters at Cavite, P. I., upon a rectangular canvas sail target 17 feet high and 21 feet long, moored sixteen hundred yards distant, the gun-pointers of the Wisconsin made a series of shots probably unprecedented in naval history.

Eight gun-pointers of the Wisconsin each fired eleven shots and made eleven hits in five minutes and forty seconds with the four 13-inch guns, an average of 1.94 hits per gun per minute. The best previous record was made by the gun-pointers of the ship last year, when the score was nine hits out of ten shots in five minutes and forty-seconds.

The best 6-inch gun-pointer on the Wisconsin made 8.5 hits per minute, and the average for the 6-inch battery was 5.14 hits per gun per minute. The best 6-pounder, semi-automatic gun made 19 hits per gun per minute, and the average of the 6-pounder battery was 14.73 hits per gun per minute.—*Nautical Gazette.*

NEW BRITISH GUNNERY COMPETITION.—The Admiralty have issued the conditions for a new naval gunnery competition, to be known as the Annual Test of Gunlayers, a feature of which is the return to shorter range firing. Only hits on the canvas are to count, and the other rules may be thus summarized: Range, 1400 to 1600 yards; speed, 12 knots for all ships; target, 21 feet 6 inches by 16 feet 6 inches. Time allowed for run: 6-inch and below, 1 minute; 7.5-inch, 2 minutes; 9.2-inch, 2½ min-

utes; 12-inch and 10-inch (latest mark), 3 minutes; one run for each gun. For missfires no time allowance is made, except in the case of a projectile breaking up before striking the target or water. Full charges of cordite will be allowed for the 6-inch quick-firing and 4.7-inch guns, and half-charges for the newer breech-loading guns, no black powder being used. Officers are to take no part in the test in a competitive sense. This test will be the only short-range shooting in the navy, the other firing being at 3000 yards and above.—*United Service Gazette.*

A dummy 6-inch gun has been placed on board the cruiser Encounter at Devonport for practice in loading. The fitting differs somewhat from those of the King Edward VII, as the return tube is not of sufficient declivity to allow the projectile to come on the deck without using the rammer, and it has to be lifted from the barrel and placed in the breech block. With this type of fitting twenty rounds have been fired in 1 minute 35 seconds. A dummy 12-pounder gun is also to be supplied to the Encounter for training purposes.—*United Service Gazette.*

GUNS OF THE NEW JAPANESE BATTLESHIP KASHIMA.—The 12-inch guns weigh approximately 59 tons each. The length is 46 feet 9½ inches (46.7 calibers). The weight of the projectile is 850 pounds. The charge will be cordite, probably of the modified type. The exact weight of the charge is not yet fixed, and neither can the velocity be given, but these guns will be the most powerful 12-inch guns which have yet been constructed. No armor which any ship can carry can hope to cope with their penetrating powers at 3000 yards. The breech screws are arranged for a parallel motion, which obviates the necessity of having a steep cone at the seating of the obturating pad. It is yet early to speak of the rapidity of fire to be obtained with these guns, but it is anticipated that the hitherto obtained rate of approximately two rounds per minute from each gun will be exceeded.

The 10-inch guns will weigh approximately 34 tons each. The length is 39 feet (46.76 calibers). The weight of the projectile is 500 pounds. The charge will be cordite, probable of the modified type. As in the 12-inch guns, the exact weight of the charge has yet to be fixed, but here again this will be the most powerful gun of its caliber in existence. As a gauge of the power of these guns, it may be mentioned that their penetrating power is equal to the penetrating power at 3000 yards of any of the 12-inch guns at present afloat in any navy. The breech mechanism will be somewhat similar in design to that of the 12-inch, and will embody all the essential advantages of that design. The rapidity of fire of these guns on the Elswick mounting, it is anticipated, will at least be at the rate of three rounds per minute with a well-drilled gun's crew.

The 6-inch guns will weigh approximately 8½ tons. The length is 23 feet 6 inches approximately (47 calibers). The weight of the projectile is 100 pounds. The charge will be probably M. D. cordite, but here again this is not definitely fixed, but these guns will be the most powerful guns of their description made, having a penetrating power at 3000 yards equal to, if not exceeding, any 6-inch guns hitherto built. The breech mechanism will be of the Elswick modified coned type, actuated by the single motion of the lever, and, as in the other gun, the necessity for the steep-coned obturator is obviated. The smaller guns also follow the general advances in power and efficiency noted in the case of the heavier armaments.—*Engineer.*

DEFECTIVE GUN SUPPORTS.—One of the principal questions which bother our British naval constructors is how to prevent injury arising from the concussion of the guns of the primary armament of our latest battleships and cruisers, and although apparently every possible precaution has been taken, all the evidence to hand shows that still greater strength is necessary to

prevent loss of efficiency. The strain on the decks in the vicinity of the 9.2 and 12-inch guns has been found to be much greater than was anticipated, and in the case of the King Edward VII the deflection of the deck in the wake of the forward barbettes, measured by the telescopic rule, was, immediately after the discharge, found to be one and a quarter inches; subsequently, however, the permanent alteration was discovered to be nearly a quarter of an inch. Although the defect may be considered of a minor character, so far as it affects the efficiency of gun fire, what has to be guarded against is the development of these weaknesses. In other vessels it has been more marked, and the points at which to apply the proper and necessary struts, partial bulkheads, carlings, and pillars, will have to be a matter of careful consideration and calculation.—*United Service Gazette.*

NIGHT FIRING PRACTICE.—Considerable attention has lately been devoted in the British navy to night firing practice, and much valuable experience has been gained, but the difficulties encountered have been greater than were anticipated. These have been mainly in the direction of range-firing. The object to be fired at is lit up by the searchlight, and it is obvious that the trial and preliminary shots which fall outside the zone of light are difficult, if not impossible in many cases to locate by the "spotter" on the gun-control platform, and it requires the most careful judgment to estimate their probable points of contact with the sea. But even with these difficulties, the results have been highly satisfactory.—*United Service Gazette.*

REPLACING 12-INCH GUNS.—The dockyard authorities at Kowloon have replaced two of the battleship Albion's and one of the battleship Glory's 45-ton wire-wound 12-inch barbette guns. Expert opinion pronounces the work a great achievement, showing that the Kowloon Dockyard is an important factor in the efficiency of the British fleet in the Far East.—*United Service Gazette.*

BOOM DEFENCES OF DOVER.—Defences of quite a novel character are being provided for Dover Admiralty Harbor in war time. Into each of the pier heads have been built several hawse-pipes, and in the pier heads themselves are to be built rooms in which there will be machinery for hauling taut tremendous wire hawsers that will pass across the two entrances from these hawse-pipes. By this means it will be impossible for any hostile submarine or torpedo-boat to gain entrance into the harbor.—*United Service Gazette.*

DEFECTS IN BRITISH NAVAL GUNS.—London, April 27.—The *Daily Graphic* prints a sensational article declaring that the 12-inch wire guns on the British battleship Majestic were crippled after firing the equivalent of only forty full charges, although it is officially estimated that the minimum life of such guns is from 150 to 200 charges.

The paper declares it is impossible to doubt that this is the endurance limit of all guns of the same pattern. Hence, fifteen of the most modern battleships, forming the backbone of the reserve Atlantic and China fleets, would be put out of action in one hour's fighting if their guns had not been previously fired, but in view of the practice firing already done they are on the verge of decrepitude, and twenty minutes fighting would compel all of them to turn tail.

The *Graphic* adds that the Woolwich pattern 6-inch wire gun also failed completely under experiments. Furthermore, it is known that sixteen big British-built wire guns on the Japanese battleships developed weakness in the action of August 10 off Port Arthur. A shell burst in one of them, probably owing to the inner tube elongating through use.

It is pointed out that Great Britain is the only power which manufac-

tures wire guns, and the paper demands that the battleships armed with such guns be rearmed without delay and the reserve renewed.

It may be mentioned that the *Graphic* is not a sensational paper.—*New York Sun.*

In the House of Commons on Thursday, in reply to Sir G. Parker, Mr. Pretyman said that the total number of 12-inch mark VIII guns that had been completed for the navy was 75—viz., 60 mounted in ships and 15 spare. Two of these had been landed for repairs. One other, which had been used for proof purposes, was awaiting repairs. The total number of 12-inch mark IX guns that had been completed for the navy was 97—viz., 76 mounted in ships and 21 spare. Thirteen more were under construction. Nineteen ships carrying these guns were completed, and three ships building carried these guns. A number of 12-inch mark VIII guns had been landed for adjustment from ships since the defect was observed in the guns of the Majestic. These had been exchanged with reserve guns because reserves were available at the time, and it was considered desirable to utilize the reserve guns rather than carry out the adjustments on board. The adjustment was of a minor nature, and was one which would in future be done on board the ships or on shore as most convenient.

Sir J. Colomb asked whether any change had recently been made in the proportions of guns of each class kept in reserve. Mr. Pretyman replied that no change had been made. The present number was that which had been adopted since 1902.

Again replying to Sir J. Colomb, who asked whether there had been any alteration since the statement on the subject made by Lord Goschen before he left the Admiralty, Mr. Pretyman said he was not aware of any alteration.

Sir C. Dilke asked whether since that time any change had been made in the proportions of the reserves kept in certain foreign fleets; also how long it would be before the guns which had been taken out of the reserves for temporary purposes would be again replaced in the reserves. Mr. Pretyman replied that, should it be decided to re-tube these guns, the process would take three months. It was desirable sometimes to re-tube guns before it was absolutely necessary in order that the life of all the guns might not run out together. But with regard to readjustment, that was a matter only of a day or two, so that the guns would be available in the reserves immediately. He was unable to answer without notice the question as to the proportions in reserves in foreign fleets.

NAVAL GUNS.—Public discussion of Imperial subjects are always welcome, alike in the interests of the nation and of the service, because in the end they result in the better education of the people on matters of State; and although many fallacies and ill-informed hypotheses are aired, the truth eventually becomes known. For this reason the *Graphic's* recent articles on naval guns are interesting, and may prove advantageous. It is true that in these articles the writer, Lieutenant C. Bellairs, has somewhat exaggerated his case, and is not quite accurate in all his facts. It is the privilege of the artist to exaggerate in order to heighten the effect he desires to produce; but there is ever the danger of the anti-climax, and the writer of the articles in question has run risks in this direction in his effort—which has undoubtedly been successful—to thoroughly awaken public interest. He has also made the mistake of arguing from the particular to the general, with the result that he may have created needless alarm, while at the same time suggesting to possible enemies a false conception of Britain's naval strength. In the interests of peace it is as important that foreigners should have a true conception of our state of preparedness for action as that our defences should be as efficient as they are represented to be.

* * * * * * * *

The obvious conclusion of the whole affair, and the one to which Lieutenant Bellairs has done a very useful service in directing prominent attention, is that our battleships and cruisers must, to be regarded as efficient, have an adequate reserve of guns. At present the reserve aimed at is one gun for every four of large caliber, and one for every five weapons of 6-inch caliber. The utter inadequacy of this, as Lieutenant Bellairs has clearly pointed out, is shown by the fact that, say, were the Channel and Atlantic squadrons engaged together in a great fleet action, it is quite possible to conceive that from twenty to twenty-four 12-inch guns might require to be renovated or renewed; and according to present conditions there would only exist six guns in reserve for the purpose. To attempt to re-line the remaining eighteen guns, with the limited number of gun-heating pits in the country, would necessitate such a delay as might jeopardize our sea-power, and would certainly forfeit a splendid opportunity of bottling effectually the injured ships of the enemy in their repairing ports. The cost of such a reserve is a small item in the balance. Even if all the guns in any ship were duplicated, one set being held in reserve, the increase in cost for any ship would not exceed an amount equal to 7 or 8 per cent of the aggregate cost of the vessel; and the great advantage thoroughly justifies the increased expenditure.

It may be urged against this that this is duplicating the accumulation of war material which is every day becoming obsolete; but since science knows no finality, that view might be urged against practically all naval expenditure; and until the periodicity of war can be accurately determined, so that due and completely modern arrangements can be made, the maintenance of peace demands a continuance of expenditure. But it can be said that the guns made as duplicates under an improved system would be quite as effective as the guns fitted on board the ship. With an increased aggregate reserve added to from time to time, as each successive ship is commissioned, it might be possible to send ships for a second time into action with, perhaps, one or two improved guns. The tendency is all towards increased strength of metals, and it is possible to conceive that, without increasing the weight, higher ballistics might be obtainable in reserve guns. Even without this advantage, there is attainable such an increased measure of efficiency in times of war from a warship which possesses a full reserve of guns as to justify the moderate expenditure desired. Apart altogether from the wear of the gun, the aim must ever be to destroy the weapons of an enemy, so that the chances are that guns, which must be exposed more or less, will prove the most vulnerable parts of a ship. The expenditure, therefore, of £70,000 or £80,000 on reserve guns, which will enable a ship costing from £1,250,000 to £1,500,000 to return as soon as possible to the line of battle at the most crucial moment of the campaign, is so obviously a small premium on efficiency that we are certain that only public support is necessary to encourage the present Board of Admiralty to carry this reform into effect.

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A brief description of the process of re-tubing as carried out at Woolwich, where spare inner tubes are kept in reserve, may not be without interest. The breech-bush is first removed, as it serves to hold the inner tube in position. The gun is then lowered, breech downwards, into one of the ordinary heating pits, and gas jets are inserted into the bore, while at the same time rings of jets are placed around the chase of the gun. In this way the structure is subjected to heat for about five or six hours, according to the size of the weapon, until the whole mass has reached a temperature of between 300 and 400 deg. Fahr. The heat within the bore is then withdrawn, but is still continued externally. A spray of cold water is driven through the bore from the muzzle end, and the sudden cooling of the inner tube which results causes it to shrink, while the heat outwardly applied to the muzzle end continues the expansion of this part. A heavy tup is then applied to the muzzle end, and this tup, after successive blows,

forces the inner tube from all contact; it is then easily removable through the breech end. The bore of the "A" tube, from which the liner or inner tube has thus been removed, is then lapped or fine bored, as necessary, to its original taper of 1 in 500. The new tube is similarly turned to the exact dimensions of the inner surface of the "A" tube, leaving only the required difference ot $\frac{1}{5000}$th part of an inch for purposes of shrinking. The inner tube is then tupped into the old gun, care being taken to insure that all shoulders are actually in bearing. When the inner tube has been fixed, the gun is put on a boring or other machine, so that the interior may be bored, chambered, and polished, the bush being subsequently replaced, whereupon the bore is rifled and lapped to its exact dimensions.

After relining, the gun is as good as new.—*Engineer.*

THE MANUFACTURE OF ARMS AND POWDER IN JAPAN.—The Japanese have made every effort to free themselves from being dependent on foreign industry for the manufacture of warlike material, and with this end in view, established in the neighborhood of Tokio, three powder manufactories, Meguro in the East, Oji in the north, and Itabashi in the west.

Meguro is an establishment exactly similar to such places in Europe and America. It employs 500 workmen and is able to turn out 3000 kegs of powder daily. Thanks to the very strict discipline maintained in the workshops, no accident has occurred at this place up to date. It is under the orders of the Minister of War.

The powder manufactory of Oji specially provides smokeless powder for naval guns, and explosives of the nature of lyddite are also prepared there. It is under the orders of the Minister of Marine.

Itabashi is an experimental center for the study of inventions. Every description of black powder for all calibers of guns is manufactured here. The factory is dependent on the Minister of War.

Another factory situated at Uji makes a speciality of smokeless powder. Here also is distilled the spirits necessary for the manufacture of these compounds; gun-cotton is also made here, the raw materials being mostly found in the surrounding country, which also supplies the substances for the composition of all powders. This establishment is also under the War Minister.

The factory of Iwahana was established without any foreign assistance, on the model of Meguro, but on a much bigger scale.

Tokio also possesses an arsenal for the manufacture of small-arms and field guns.

Heavy guns (model Arisaka) howitzers, mortars, and their projectiles are made at the Osaka arsenal. The instruments and machines used for guns are made in Japan from imported models.

Saddlery and accessories also come from Osaka.

The first venture in the establishment of large furnaces was made in 1875, near the well known magnetic mines of Kamaichi, province of Rikuchu.

A new factory intended for the manufacture of steel and articles made of steel has just been established in the immediate proximity of the coal mines at Wakamatsu on the north side of the island of Kiou-Siou, about 25 km. to the west of Moji.

The factory of Wakamatsu is an Imperial Japanese Government establishment. It has taken the initiative in the development of the metal industry in Japan and has undertaken the risks which private enterprise could probably not have been able to do, although the results may have the very greatest importance for the future of the country.—*Proceedings of Royal Artillery Institution.* (Translation from *Revue d'Artillerie.*)

WAR MATERIAL.

(Extract from MR. R. A. HADFIELD'S Presidential Address to the Iron and Steel Institute.)

This address would be hardly complete without some reference to the use of steel for war material. Much as war is to be abhorred, it has some compensations; and those who prepare weapons of offence and defence have largely assisted in the perfecting and introduction of special steels having very valuable qualities which have also been turned to good account in the arts of peace. In armor plates the advance from those of wrought iron to the modern cemented hard face type has been marvelous. Armor of to-day has a figure of merit not far from three times that of wrought iron, and this, as will be readily understood, has meant in itself a revolution in the building of war vessels. There is no question that had the vessels engaged on either side been clad with wrought iron during the recent naval engagements in the Far East hardly one would have survived the contest. We are told that but little perforation of armored parts was effected.

Armor Plates.—Compound plates for a time struggled hard against mild or tough steel, but it was Harvey, the American, who introduced the bold idea of applying and improving the old process of cementation to the production of armor having a hard face, practically impenetrable to any type of projectile excepting those with caps. Great credit is due to him for the steps he took. His efforts were wisely fostered by the American Navy Bureau. Then Ehrensberger and Schmitz of Krupp's works, with all the wonderful resources of that great establishment at their disposal, perfected this system and improved the steel of which the plates were made to such a degree that Harvey plates in their turn had to give way to what is now known universally as "K. C.," or Krupp cemented, armor.

As an example of the great superiority of this new description of armor it may be mentioned that a 6-inch plate affords equal resistance to more than 18 inches of wrought iron. It will be seen from this what a revolution has been produced in the designing of warships by the saving of weight devoted to protection, and this again is due to the metallurgist.

The problem of suddenly arresting armor-piercing projectiles, striking in some cases with 30,000 foot-tons of energy, has not been an easy one, as will be readily understood; therefore the greatest credit is due to the firms of Krupp, Brown, Vickers, Cammell, Beardmore, Armstrong, Schneider, Terni, Witkowitz, Carnegie, and Bethlehem, which have gradually brought their work to that state of perfection that an uncapped projectile can be stopped in its more than "mad career" with ruin to itself, while the plate passes successfully through this trying ordeal unperforated and with nothing more than a few face cracks. Messrs. Schneider in November last rolled a nickel-chromium steel armor plate weighing 65 tons, the ingot having been 4 feet across and 9 feet in length.

Although the price paid for such armor is high the makers well deserve their reward, as the risk and anxiety involved in the manufacture are very great.

Projectiles.—Having said so much for armor, what shall be said of the latest type of projectiles, which by means of a cap has enabled this remarkable armor to be readily perforated? The difficulties attending the production of a projectile of this high efficiency quite equal those met with in the manufacture of armor. It is not a little creditable to the projectile makers of this country, who are neither nursed nor pampered by their government, as are the manufacturers abroad, that they have met this want. In one case a 12-inch armor-piercing shell was fired at a 12-inch Krupp cemented plate at a velocity of about 2000 foot-seconds, the plate being completely perforated and the projectile after passing through this trying ordal being found in the rear of the plate in a condition for bursting.

With the complex stresses involved in such a trial, both to the plate and to the projectile, it will be seen that the problem of producing the most suitable material for the purpose is one demanding a very high order of skill and knowledge.

There still remain many problems to be solved in plate and projectile manufacture, and also in the production of steel in modern high-velocity guns, but out of chaos order is being evolved.

Gun Steel.—In the construction of guns carbon steel has long held its own. Naturally the risk of the gun bursting has necessitated great caution in the production of the material to be used. Special steels have been regarded with suspicion, but there is now a growing disposition to consider the question of using a special steel having higher efficiency as regards resistance to the severe stresses met with and also to erosion. Attention is also being given to the means for avoiding "streaky" steel, which in the past has given much trouble.

In order to afford an exact idea of the enormous energies which have to be dealt with it may be mentioned that a 12-inch breech-loading gun has been fired in this country with a muzzle velocity of close upon 2700 foot-seconds. This means a striking energy of 42,220 foot-tons. The projectile if uncapped would be capable of perforating 44 inches of wrough iron, 34 inches of mild steel, 19 inches of Krupp cemented armor; if a capped projectile were used about 23 inches of Krupp cemented armor would be pierced. As may be imagined, the inner tubes of guns at such velocities are soon worn out; in fact, in large caliber guns an improved steel for these inner tubes is a matter much to be desired.

In addition to the well-known makers of guns and gun steel in this and other countries may be added the names of the Skoda and Böfors companies, which are also doing excellent work.

There are many other warlike purposes to which the use of steel of high quality is applied, and, generally speaking, there is room for research on all sides in this branch of metallurgy. To use the words of an American on the subject, "Progressive development of ordnance material requires continual prying with stimulated imagination." This is very true, for in this field difficulties are constantly occurring to set us thinking how to best overcome them.

MISCELLANEOUS.

SCOUTS.—One of the most discussed types of warships at present is the cruiser of small displacement and great speed—the protected cruiser, as it is generally called, or the unprotected cruiser, as the opponents of the type refer to it. The controversial question is: Is there a place in a naval force for such craft, and is the introduction of a novel type indispensable for scouting in modern warfare? There is much loose talk about scouts, which are regarded by many people as a novelty; as a matter of fact, the novelty is more in the denomination than in any radical change of strategy and tactics. The scouts, *estafette*, scout-cruiser, *Aufklärungskreuzer*, and *aviso*, are but the different English, French, American, German, and Italian official names for a craft characterized by swiftness, weak armament, and still weaker protection, and mark by no means a new direction in naval construction. The steady rise in displacement and speed in this class of cruisers is but a natural evolution common to all other warships. The adversaries of the type affirm that it is only *la rage du nombre* which has made them now so popular; that scouts can be of any use, they say, is doubtful; too weak to rely upon themselves for defence, unable to attack anything above destroyers, they are more a nuisance than an aid to a fleet; wireless telegraphy has much limited the number of ships to be employed as scouts and despatch boats, and armored cruisers or destroyers ought to suffice for the want of a fleet of battleships. The arguments put forward by the enthusiasts of light, speedy cruisers are, of course, just the opposite

of those sustained by their advocates, so that the question, theoretically at least, remains undecided. In practice, all navies are thoroughly studying the problem, and as the results obtained until now are very interesting, it will be well to examine a few practical instances and see what stage the progress of construction, as far as scouts are concerned, has now reached.

Russia has been ahead of many nations in the adoption of comparatively high displacement and speeds. At the beginning of the war with Japan she possessed five excellent scouts, the Novik, Jemtchug, Izumrud, Bojarine, and Almaz. The Izumrud and Jemtchug, attached to Admiral Rojestvensky's fleet, may be looked upon as two of the most valuable units of the reserve squadron, capable of rendering precious services to the Russian admiral; they have a speed of 24 knots, which will allow them to keep in touch with the Japanese if ever the two rival fleets meet, and give Rojestvensky the choice of accepting or refusing a fight; the Japanese have no ships of a corresponding type, and, in fact, no cruiser capable of steaming more than 21 knots at the present moment, after the wear and tear of the war.

The Bojarine was torpedoed and sunk near Dalny, and the Novik, of which the Jemtchug and Izumrud are practically copies, having run short of coal, was sunk by her captain at Korsakow. The Novik was built at Schichau's Yard, and more than realized the expectations of her builders; designed for 25 knots, a speed not yet attained by ships of her class, she reached on her trials 25.7 knots with 18,600 indicated horsepower, and she just missed being a success on account of her limited bunker capacity, which did not allow her, notwithstanding her fine speed performance at trials, to escape the Japanese cruisers; her instance is one to be meditated upon, as most of the new scouts designed or building, as our own, have a still smaller coal endurance than the Novik's.

In the accompanying table the comparative data of some typical cruisers intended for scouting purposes are given to facilitate the appreciation of their relative military value. The United States scout-cruiser Chester represents perhaps the most advanced specimen. She and her sister ships Salem and Birmingham are the latest projects for new scouts approved for construction last year, and five more are contemplated in the new programme of naval constructions. Their armament is perhaps not up to date if they are to fight nickel-steel protected destroyers; it is, in fact, exactly the same as that carried by the Italian Agordat and Coatit, though their displacement is nearly three times as big as that of these avisos.

Besides the data given in the following table, some additional information is here abstracted from the Navy Department's design: Number of rounds for the 3-inch guns, 3600; number of torpedoes, 8; protection to engine and boiler hatches, 26-inch nickel-steel; athwart bulkheads, 1-inch nickel-steel; estimated weight of nickel-steel armor, 205 tons; estimated weight of guns and ammunition, 140 tons; estimated weight of machinery and spare parts, 794 tons.

The German scout Bremen gives its name to the class including the Hamburg, Berlin, Lübeck, and München, already built, and three more building. These successful vessels, which combine powerful armament, good protection, and coal endurance, with a small displacement, have given brilliant results at trials. The Hamburg reached 23.17 knots, with 147 revolutions and 11,400 indicated horsepower; with natural draft, 20.4 knots, with 124 revolutions and 7150 indicated horsepower. In coal consumption these cruisers have proved uneconomical, and are therefor not adapted for

COMPARATIVE DATA OF SOME TYPICAL SCOUTS.

Principal Characteristics.	Adventure and Attentive.	Novik.	Chester and class.	Bremen and class.	Agordat and Coatit.
Nationality	British	Russian	U. S. A.	German	Italian
Date of completion	1904–1905	1900	1905?	1904–1905	1900
Length at the water-line, ft	370	347	420	361	287.5
Extreme breadth, ft	38	39	48.75	40	30.5
Draft on trial, ft	13.25	19	16.85	17.25	10.25
Displacement, tons	2750	3,000	3,750	3,000	1300
Indicated horse-power (designed)	17,000	18,000	16,000	10,000	8000
Speed (estimated), knots	25	25	24	22.5	23
Machinery	Two sets	Three sets	Two sets	Three sets	Two sets
Boilers	Yarrow	12 Thornycroft	Water-tube	Schulz	....
Protective deck, in	1¼	2	1½	2	¾
Guns	10 3-in.	6 4.7-in. 1 9-pdr. 8 47 mm. 2 1-pdr.	12 3-in.	10 4-in. 12 1-pdrs. 6 automatic	12 3-in.
Torpedo tubes	None?	1 stern, 4 b'dside	Two 21-in.	Two 18-in.	Two 18-in.
Coal—normal, tons	165	....	....	400	160
maximum tons	380	500	....	700	300

service in foreign stations. The following is the performance of the Bremen on trials:

I.H.P.	Number of revolutions.	Speed in knots.
11,920	144.3	23.29
10,920	140.2	22.50[1]
9,750	135.9	22.47
6,440	120.5	20.33
4,320	106.1	17.96
2,890	94.7	16.03
1,940	82.4	14.06

Apropos of these German scouts, it may be said that they are far from realizing the unification of calibers which in this class of vessels is a necessity. As their probable enemy is the destroyer or a cruiser of equal size to theirs, it is obvious that augmenting the number of 4-inch guns and abolishing the one-pounders, their gun fire would be more efficient, and the confusion which arises in handling ammunition for different guns would be avoided.

Data is also given of the Italian despatch boats Agordat and Coatit. They typify the scout of minimum displacement, compatible with the high speed of this class of vessels. The following additional information applies to the speed trials of the Agordat: Diameter of cylinders, 28¾ inches × 39¾ inches × 47 1/8 inches; stroke, 23⅝ inches; indicated horsepower, 8520; speed, 23.4 knots; number of revolutions, 232; weight of machinery per indicated horsepower, 49.3 pounds.

The characteristics of the vessels contained in the table given herewith are suggestive of a distinction which might be made in the classification of scouts to avoid misconception, now that the type is so much discussed. A naval force may employ numerous light cruisers of limited cost as despatch boats and scouts. Their importance as fighting ships must be so small that their presence or absence will little enhance or diminish the value of the fleet to which they belong. If they get dangerously engaged they must be abandoned to their fate, not to compromise the movements of this fleet, to whom their loss will mean an unimportant sacrifice. They are to attack destroyers and torpedo-boats; the caliber of their guns must be fixed solely in view of this occurrence. Their speed must be greater than that of all big battleships and cruisers to enable them to keep in touch with the enemy and to escape when chased by him.

All these requirements might be embodied by a 1500-ton ship, an improved Agordat, with eight 4-inch, in lieu of twelve 3-inch guns, 24 knots speed, and ¾-inch nickel-steel armor deck to protect the vitals; the resulting fighting unit would be an excellent scout and anti-destroyer of a class which might be called unprotected. If better protection is desired and scouts are designed to meet more complicated requirements, offensive and defensive, in addition to scouting, a disproportionate rise in displacement will be the result, thus arriving at cruisers of 3000 to 4000 tons and about 18,000 indicated horsepower.

The United States Chester and sister ships mark the evolution now reached in this direction, and their name "scout-cruisers" appropriately conveys the idea they embody. The new British scouts are the connecting link between the "unprotected scout" and the "scout-cruiser," but they represent a transitional stage rather than finality in the construction of scouting ships. Whether a great number of unprotected scouts is to be preferred to a limited number of scout-cruisers is a question open to discussion.—*Engineer.*

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[1] At the trial on which this speed was obtained the depth of water was about 14 fathoms; all the other speeds given above were obtained at a depth of 35½ fathoms.

WARSHIPS, BUILT AND BUILDING.—The annual return asked for by Sir Charles Dilke, showing the fleets of Great Britain, France, Russia, Germany, Italy, United States, and Japan, has been published, corrected to March 31 last, but a number of vessels are included in the return which have been disposed of by sale, or removed from the effective list as inefficient. The return is prefaced by the accompanying comparative numerical statement.

BUILT.

	Gt. Britain.	France.	Russia.[5]	Germany.	Italy.	U. States.	Japan.
Battleships, 1st class	53	20	14	16	14	12	5
Battleships, 2d class	4	9	4	4	—	1	1
Battleships, 3d class	2	1	1	9	2	—	—
Coast defence vessels, armored	1	13	12	11	—	11	1
Cruisers, armored	24	17	6	4	6	6	8
Cruisers, protected:							
1st class	21	7	5	1	—	3	—
2d class	45	16	[1]3	8	5	17	11
3d class	[1]21	16	2	16	[2]13	2	7
Cruisers, unprotected	—	1	3	17	1	7	8
Torpedo-vessels	21	[3]15	7	1	11	—	1
Torpedo-boat destroyers	128	31	40	37	13	20	21
Torpedo-boats	91	238	162	84	128	31	84
Submarines	17	39	13	[4]1	1	8	—
	428	421	272	209	194	118	147

BUILDING.

Battleships, 1st class	8	6	5	6	4	12	2
To be laid down 1905-6	1	—	3	2	—	1	—
Cruisers, armored	15	6	2	3	1	7	—
To be laid down 1905-6	4	2	4	1	3	2	—
Cruisers, protected:							
1st class	—	—	2	—	—	—	—
2d class	1	—	—	—	—	—	—
3d class	—	—	—	4	—	—	—
To be laid down 1905-6	—	—	—	3	—	—	—
Scouts	8	—	—	—	—	—	—
To be laid down 1905-6	—	—	—	—	—	3	—
Torpedo-boat destroyers	16	8	55	6	—	—	—
To be laid down 1905-6	18	4	8	6	4	—	—
Torpedo-boats	—	26	10	—	27	1	—
To be laid down 1905-6	—	70	—	—	—	—	—
Submarines	12	9	12	[4]1	5	—	—
To be laid down 1905-6	11	23	2	—	2	4	—
	94	154	103	32	46	30	2

[1] Including one partially protected.
[2] Including two partially protected.
[3] Including one torpedo depot ship.
[4] Experimental.
[5] 1st class battleships; one interned. Cruisers, protected, 1st class; two interned, one reported disabled. Torpedo-boat destroyers; ten interned.
—*Page's Weekly.*

A NEW COLLISION MAT.—A final trial of the collision mat, the invention of James Speeding and Co. of Sunderland, took place on Wednesday in Portsmouth Dockyard. No. 10 dock being full of water and the adjacent dock empty, the sluice in the caisson between the two was opened and the mat placed in position over the aperture. The flow of water into the dry dock was stopped effectively by the mat, and the trial was considered satisfactory. It is understood that the invention will be recommended for further experiments by sea-going ships.—*United Service Gazette.*

FLOATING COAL DEPOT.—A series of trials with the new floating coal depot at Portsmouth has just been concluded, this being the first of a number of similar vessels that are to be built. It has a capacity of 12,000 tons. There are automatic appliances for filling the coal-bags, and four towers on deck, each fitted with Temperley transporters to haul the bags from the four holds and deliver them over the side. The whole apparatus is worked by electric motors, and the electricity is generated on board. For the purpose of the trial, the floating depot was placed in the North Lock, and the ground alongside was supposed to be the deck of a battleship. In the final test three thousand tons of coal had to be delivered over the side in six hours. The results proved very satisfactory.—*United Service Gazette.*

THE LARGEST DOCK IN THE FAR EAST.—In the present very critical and interesting state of affairs in the Far East, it is worthy of note that the largest dock in that part of the world has just been completed and has received the biggest steamer in the Pacific waters—namely, the Minnesota. It is situated at Nagasaki, and is the property of the Mitsu Bishi Company, of which the chief partners are the members of the Iwasaki family, and who are also closely associated with the Nippon Yusen Kaisha, or Japan Steamship Company, the growth of which has been one of the most remarkable features in the making of new Japan. The dock was commenced in January, 1902. It has thus taken fully three years to construct; but this must be considered a moderate time when it is remembered that it can accommodate a steamer 714 feet long. The *Japan Dail Mail* pays a tribute to the Iwasaki family for the national services they have rendered to Japan. Quietly and unostentatiously, that family has gone on for nearly forty years adding to the empire's most valuable resources. It may be said with truth that to Iwasaki Yataro Japan owes her mercantile marine works, which are now one of her most important assets. He it was that laid the foundations of that marine, and in a remarkably short time organized a fleet of steamers which gave the world a new conception of Japanese enterprise and capacity. The Iwasaki family did not confine their attention to ship owning but entered entensively into other departments of industry, especially coal-mining and its allied industries. The development of the coal-fields of Japan has been one of the main causes of its remarkable uprising as one of the great nations of the world. Ship-owning and coal-mining naturally led to shipbuilding, and their shipbuilding yards and dockyards are now the most complete in the Far East, and are capable of turning out work of the highest quality, and for vessels of the greatest magnitude. These works have a very interesting history, beginning, as they did, in a small way in the early days of foreign intercourse. After the Restoration, they were managed by the Public Works Department, and very much extended. Almost twenty years ago they were sold to the Mitsu Bishi Company, and Messrs. Iwasaki have taken a special pride in making them as complete as possible. Immediate returns seemed to be a very secondary consideration, the aim of the founders being to equip an establishment of which Japan might be proud. The *Japan Daily Mail* says that "a wreath should be placed on the grave of Mr. Iwasaki Yataro when the nation celebrates its great victories in Manchuria; for had not his genius and dogged resolution equipped the country with the beginnings of a mer-

cantile marine, the immense army now carrying the banner of the Rising Sun to such splendid successes could not have been transported oversea, or supported throughout the arduous campaign of the past thirteen months. It is in worthy succession to that remarkable man's achievements that his brother, Baron Iwasaki Yanosuke, and his son, Baron Iwasaki Hisaya, are able to augment the country's victorious rejoicing by announcing the completion of a dock where battleships can be built." Probably of more importance than all they have done is the reputation the Iwasaki family have gained for integrity and fair dealing in all their relations, and thus have done much to dispel the idea that the Japanese are specially wanting in commercial integrity; an idea which had its origin in conditions which have almost entirely disappeared.—*Engineering.*

SUBMARINE SIGNALLING BY MEANS OF SOUND.

(A paper by MR. J. B. MILLETT, read at the meeting of the Institute of Naval Architects on April 14.)

After very briefly reviewing the history of experiments in the transmission of sound by submarine bells since Colladon and Sturm tested the sound conductivity of water in the Lake of Geneva early in the last century, the paper brings the reader to experiments made by Mr. A. J. Mundy, of Boston, Mass., and Professor Elisha Gray, from 1898 to 1902, on which nearly £20,000 were spent. In 1902, Professor Gray died, and Mr. Mundy, having fallen seriously ill in the next year, resigned, the work of investigation has since been carried on by a company known as the Submarine Signal Company, of which Mr. Millett is vice-president and general manager. The object of the investigation has been to find means of dispensing with an outside receiver for submarine signals. Mr. Mundy had found that if a microphone were placed in water in a tank fastened inside the hull of a ship sound would be received readily. Unfortunately, the ship's own noises also were heard, and a great deal of the work has been an attempt to neutralize them. This appears to have been successfully achieved. Mr. Millett says:

"In order to thrash out the menacing problem of 'ship's noises' arrangements were made to install the hearing apparatus—transmitters and receivers—on a line of steamers running between New York and Boston. Permission was obtained from the United States Lighthouse Board—in advance of any official inspection—to place submarine bells on four of the lightships on the course of these steamers, all expenses to be borne by the Signal Company. These bells were accordingly installed and the steamers equipped, which afforded an opportunity for tests absolutely essential to ultimate success. The running time between New York and Boston is about twenty hours, and as the lightships had orders to ring these bells for an hour before and after the time the steamer usually passed them, ample opportunity for exhaustive tests was secured. No phantom ever disappeared more completely than the much-dreaded 'ships' noises' when once the attack was made systematically. It was found in time that if the tanks were placed below the water-line at certain fixed points aft, and at certain fixed points above the keel, if they were filled with a solution denser than sea water, and if the transmitters were adapted to the recognition of sounds of high pitch, and not those of low vibration—in itself a problem of immense difficulty—the submarine bell notes and other sounds like screws of steamers were readily heard. It appeared as if the noises made by machinery on board preferred to pass along the hull rather than turn into the denser medium in the tanks, whereas transmitters fastened directly to the skin of the ship had invariably heard so much 'ship noise' as to be useless for detecting outside signals."

At the same time, suitable transmitting apparatus had to be found:

"Repeated tests with bells in the open ocean had proved that a bell with

a lip, or 'sound bowl,' several inches thick, and having a high musical note, gave the best carrying note in the water, although such a bell was quite unsatisfactory in the air. The experiments began with ordinary church bells. The hammer was actuated by electric magnets contained in a water-tight chamber, the whole designed to be submerged at any depth and operated by cable from a power house on shore. A bell weighing 1000 pounds was kept in operation in an exposed position on the Atlantic coast for one year, with entire success, at a depth of 60 feet from the sea surface, and 50 feet above the floor of the ocean, on the end of a cable 1500 feet in length. The present type of bells gives such entire satisfaction that further experiments have been stopped. The large number of overtones in an ordinary bell which give it the desired musical quality are not wanted, apparently, in a submarine bell, and are not found in the new form. The power used may be steam, compressed air, electricity, or hydraulic. In the case of compressed air or electricity, the mechanism for ringing the bell is placed directly over and attached to it, which ensures its operation in whatever position it may be made to assume by tides or currents. It may be said, therefore, that so far as bells for submarine signals are concerned, the best form has probably been found."

The method of communicating with a ship is the same as has been used with most preceding apparatuses of the kind. The bell, say at a lighthouse or near a dangerous rock, is rung continuously. The ship is provided with a port and starboard receiver; when the sound in both is of the same intensity she is presumed to be pointing direct towards the bell, and can lay her course from the observation made. The position of the bell can, it is claimed, be ascertained to within one-eighth of a point up to the maximum range, which may amount to five miles or more. The apparatus has passed out of the early experimental stage, and several very large vessels are now equipped with it, amongst them the Kaiser Wilhelm der II, Kaiser Wilhelm der Grosse, the Kronprinz, and the Deutschland. Concluding his paper, Mr. Millett says:

"It may confidently be said that ships need not collide or go ashore, providing submarine bells are provided and the ships have control of their own motions. The writer is aware of the breadth of this statement, but he makes it without reservation. It is based on an immense number of personal tests made on vessels of various builds and sizes, in all weathers and at all rates of speed; against, with, and across the tide. It is confirmed by the testimony of a large corps of assistants, all working to detect and correct any weakness in the apparatus or in the method of using it, and by the more important testimony of hundreds of seafaring men chosen from ships of all nations in New York, Boston, Philadelphia, and Canadian ports. In no case has an observer failed to locate the direction of a given submarine bell, whether the observer was in a closed cabin, in fog, in a thick snowstorm, or, as in several cases, blindfolded."

In the brief discussion which followed, Captain Thompson, of the Trinity House, spoke of the objection which existed to the means of signalling, namely, that only vessels provided with proper receiving apparatus could take messages; he thought, however, that whilst air signals, with all their faults, could never be dispensed with, submarine signals might be used in conjunction with them.

Captain Bacon, speaking of the possibility of detecting submarines by the noise of their engines, observed that, as many of them were propelled under water electrically, there was no engine beat, and the noise they made was very slight. He did not think, either, that receivers on board submarines would be of much assistance in guiding them to a ship. The optical apparatus now used has a long range, and submarines cannot remain long under water without taking a visual observation. He asked anyone to attempt to walk along a broad street, like the new Mall, with their eyes shut. They would experience the feeling of a submerged submarine. He would be surprised if they could resist the temptation to open their eyes

and see where they were going for more than sixty or seventy yards. For pure navigation, however, he thought a great advance had been made by the apparatus.

Sir William White having expressed his high opinion of the apparatus, and the author having made a few explanations, the discussion closed, and the president wound up the meeting with a few words.—*Engineer.*

THE OPPOSING FLEETS IN THE FAR EAST.—The Russian fleet of war vessels now in the Far East under command of Admiral Rojestvensky, together with the squadrons of Rear-Admirals Falkersam and Enquist, is as follows:

	Tonnage.	Launched.
BATTLESHIPS.		
Osiliyaba	12,674	1898
Imperator Alexander III	13,516	1901
Sissoi Veliki	10,400	1894
Navarin	10,206	1891
Borodino	13,516	1901
Orel	13,516	1902
Kniaz Suvaroff	13,516	1902
ARMORED CRUISERS.		
Dmitri Donskoi	6,200	1883
Admiral Nakhimoff	8,524	1885
PROTECTED CRUISERS.		
Aurora	6,731	1900
Oleg	6,675	1903
Svietland	3,862	1896
Almaz	3,825	1903
Jemtchug	3,166	1903
Izumrud	3,106	1903

DESTROYERS.

Twelve, of 350 tons displacement and 26½ knots speed.

AUXILIARY CRUISERS AND TRANSPORTS.

Don, Ural, Terek, Kuban, Irtish, Anadye, Argun, Smolensk, and Petersburg, scout cruisers, armed. (Converted merchant ships of high speed.)
Hospital ship Orel.

REPAIR SHIPS.

Kamchatka, Ocean.

COLLIERS.

Korea, Kitai, Kniz Gortschakoff.

This is one of the largest fleets that ever went to sea, and one of the most powerful. Some idea of its cost may be obtained from the following table:

Seven battleships, $6,500,000 each	$45,500,000
Two armored cruisers, $5,000,000 each	10,000,000
Six protected cruisers, averaging $2,500,000 each	15,000,000
Twelve destroyers, $250,000 each	3,000,000
Nine auxiliary cruisers, averaging $1,000,000 each	9,000,000
Two repair ships, $500,000 each	1,000,000
Three colliers, $500,000 each	1,500,000
Hospital ship	750,000
Total	$85,750,000

The following is a list of Japanese vessels available for attacking Rojestvensky:

	Tonnage.	Launched.
BATTLESHIPS.		
Mikasa	15,443	1900
Asahi	15,443	1899
Shikishima	15,088	1898
Fuji	12,049	1896
Chin Yen	7,335	1882
ARMORED CRUISERS.		
Azuma	9,456	1899
Yakumo	9,800	1900
Iwate	9,906	1900
Idzumo	9,906	1899
Tokiwa	9,855	1899
Asama	9,855	1898
Kasuga	7,700	1902
Nisshin	7,700	1903
PROTECTED CRUISERS.		
Kasagi	4,978	1898
Chitose	4,836	1898
Itsukushima	4,278	1889
Hashidate	4,278	1889
Matsushima	4,278	1889
Takasago	4,227	1897
Naniwa	3,709	1885
Takashiho	3,709	1885
Akitshushima	3,172	1892
Idsumi	2,967	1884
Akashi	2,800	1897
Suma	2,700	1895
Chiyoda	2,439	1890
Niitaka	3,420	1902
Tsushima	3,420	1902
UNPROTECTED CRUISERS.		
Yayeyama	1,600	1889
Takao	1,764	1888
Katsuragi	1,502	1885
Yamato	1,502	1885
Mushashi	1,502	1886
Tsukushi	1,372	1881

DESTROYERS.

Twenty, of displacements from 240 to 380 tons.

In all, there are eighty-two modern fighting ships in the two fleets.—*Nautical Gazette.*

THE YARROW-NAPIER MOTOR-BOAT.—On March 4 last an exhibition trial was made on the Thames, at Greenwich, of a little boat which is said—no doubt accurately—to have a speed considerable in excess of that of any other vessel of equal length. The next fastest boat in the world, of this class, is the American Challenger, the mean speed of which is stated by the United States press to be 25.01 knots. Next to this is the Trèfle-à-Quatre, a French boat, which has accomplished a speed of 22.7 knots. The Yarrow-Napier motor-boat is 40 feet long, and is fitted with two four-cylinder petrol engines, driving twin-screws, and giving collectively about 120 horse-

power. The boat has been constructed by Messrs. Yarrow and Co., and the engines by Messrs. Napier and Co. She is, we believe, intended to be used by Mr. S. F. Edge for racing purposes, as she is to be despatched to Nice, where she will doubtless take part in the forthcoming competitions in the Mediterranean.

A trial of this little vessel had been previously made on the measured mile in Long Reach, when a speed of practically 26 knots was reached. The run against tide was made in 2 minutes 25 seconds, and the mile with tide was covered in 2 minutes 12.6 seconds. The mean speed was therefore 25.988 knots, or just on 30 statute miles an hour. The result is more remarkable as the day was by no means favorable to a good performance, for there was, according to the meteorological reports, half a gale of wind blowing at the time, and even in the inclosed waters of Long Reach this would make a considerable difference to the speed results for so small a vessel.

The hull is constructed of what is described as a special steel, which is probably of the description used by Messrs. Yarrow in their torpedo craft, and has had so much effect in lightening the structure. The framing is on the longitudinal principle in order to secure the maximum strength fore and aft. Naturally, the scantling of the hull, in a petrol motor-boat may be much lighter than in a steam-driven vessel, as there is no boiler to add to the displacement, and the weight of fuel is considerably less—about one-third that of coal.

As already stated, the length of the boat is 40 feet, the width is 5 feet, and the draft of water of the hull is 8 inches. The total weight of the boat in running trim is 3 tons 4 cwt., of which the machinery weight approximately one-half, and the hull the other half. The engines have each four cylinders, or eight in all, the dimensions being 6½ inches for the diameter and 6 inches for the stroke. Each set of engine drives a three-blade propeller.

The form of hull is unusual, the shape having been arrived at by means of a long series of experiments made by Messrs. Yarrow with full-sized models towed by a torpedo vessel. The bottom for the greater part of the length is quite flat, the bilge being only just rounded off. The bow is by no means sharp, and there is no gripe forward, the forefoot being quite blunt, but this is of little consequence once high speed is reached, as the bow lifts right out of the water for a considerable distance, the vessel running entirely on the flat part of the bottom. This is a condition purposely secured, the idea being to make the boat rise bodily in the water when travelling at high speed. In the early days of torpedo-boat construction it was noticed that the displacement was reduced somewhat when the highest speed was reached; but, naturally, with the greater weight of steam machinery this effect was hardly a practical factor, excepting at a great expenditure of power,

Amongst the models tried by Messrs. Yarrow—and they were, it must be remembered, the full size of the actual boat—the one which gave the least resistance at speeds aimed at was flat from end to end; in fact, had no "shape," as the boat-builder understands the term. The hull appeared to glide on the surface of the water, and the recording-instruments indicated that such was approximately the case. This points to the fact, as Mr. Yarrow has stated, that the power exerted by the engines were better devoted to supporting the boat on the surface rather than by pushing it through the water. With a flat-bottom boat the speed may be such that the water, which would be displaced were the boat at rest or travelling slowly, has not time to move downwards out of the way before the boat has passed; and, as no two things can be in the same place at the same time, the boat has to rise bodily. That this will occur to some extent even with ordinary ship-shape vessels, when the speed is excessive, is well known; and with a flat-bottom craft, where the movement of the water must be at first vertical, the action will evidently be intensified. This was

well illustrated by Mr. Yarrow by means of the analogy of a flat stone being thrown on the water, making what children style "a duck and a drake." Evidently the stone would travel further and faster than if the same energy were expended in projecting it partially submerged. Considering the speed at which the boat travelled—or, perhaps, for reasons stated, it was on account of the speed—the waves thrown off appeared very small, although those that were thrown off were steeper than usual. It was difficult to judge on account of the disturbed state of the river, and it would be interesting to see the boat tried on a perfectly calm day. If runs could be made at the best speed in deep water, and also in water so shallow as only to give a sufficient margin of draft just to float the vessel, some interesting results might be obtained. Possibly a safe stretch, with a soft bottom, might be found in the estuary of the Thames or Medway.

In this boat, as stated, a considerable length of the forward part is clear of the water when she is travelling at her best speed. Unfortunately, there was too much popple on March 4 to estimate the distance, but evidently it was something considerable. It would naturally add to the speed in quite smooth water if the forward out-of-water length were sawn clean off, as the weight would be reduced; but that would give a very bad bow for waves to strike against, and it is possible the initial resistance might be too great. It may be suggested, however, that a cone-shaped bow might be of advantage, as it would be lighter, and oppose less projected surface to the blow of the waves than even the orthodox section.

The performance of this boat is exceedingly interesting, as it gives information regarding what takes place at extremely high speed in a vessel propelled by its own screw or screws. It is not difficult to arrive at conclusions in this field of research by means of tank experiments, leaving the disturbing action of the screw out of account; but that does not represent the actual condition of affairs in a ship at sea, when the propeller must have considerable influence on the steam lines. To arrive at some conclusions in this respect by tank experiments, a model has had a screw placed in the usual position and driven by an outside means; but to have recourse to such a plan obviously is attended with considerable difficulty.

Mr. Yarrow has attacked this problem with his usual thoroughness and appreciation of the practical needs of the situation, and has added one more to the long list of benefits he has conferred on the science of marine propulsion. He states that had a boat of similar dimensions to that exhibited on March 4 been required to be driven by steam, his firm would not have been prepared to promise more than 16 knots as a maximum; so it would appear that the substitution of the petrol-engine for a steam-engine and boiler has resulted in a gain of no less than 10 knots.

Mr. Yarrow estimates, on the basis of the performance of the present boat, that a destroyer of 220 feet with petrol-engines would attain a speed of 45 knots. The destroyers of this length built by Messrs. Yarrow for the Japanese Government steamed at 31 to 32 knots. As Mr. Yarrow remarked, all that remains to be done in order to reach the 45 knots is to perfect the internal-combustion engine, so as to enable larger sizes to be used successfully.

Such advances are without precedent in the history of marine propulsion; and they hold out such rewards that it can hardly be doubted every effort will be made to adopt the internal-combustion engine for still larger vessels. The difficulties in the way are numerous, the most prominent one at present being the high price of the fuel used; but beyond this there are many physical and mechanical troubles to be overcome before internal-combustion engines of large size can be used at sea.

The saving in weight of fuel is, of course, considerable, it being placed by Mr. Yarrow at two-thirds that of coal for ordinary steam machinery of the same power. The addition this would give to the radius of action is a military advantage, the value of which is apparent for torpedo craft; whilst it would render destroyers far more capable of accompanying a

fleet, as, for a given distance to be covered, they need not be weighted down to the same extent, and would be more seaworthy. In the boat tried on March 4 there is a petrol tank of a capacity of 100 gallons—a quantity sufficient to take the boat 130 miles at full speed, or double that distance at three-quarter speed.—*Engineering*.

BOOK NOTICES.

"Transportation of Troops and Material," by Major Chauncy B. Baker, Q. M. D. U. S. A.

A practical manual from the point of view of a quartermaster in charge of the movement; treats of both land and water transport. The subject is well handled and will contain valuable information and prove of interest to naval officers in connection with the movement of troops, and to navy paymasters and marine quartermasters charged with responsibility for same. It is of particular interest as showing appreciation in the service of the mistakes that occurred in 1898, and is in effect a plea and a safeguard against the recurrence of these mistakes. The book is replete with historical examples of the principles and methods advanced. The details of transportation by water, by land, and by rail, are exhaustively treated, both where the means of the transport are owned by the government, and by private individuals or corporations, and the government supervision of private transportation is thoroughly discussed. Railway equipment of standard pattern is fully described with complete information as to capacity, and an outline of the orders issued from military and railroad headquarters at Fort Riley in 1903 for the dispersal of the forces encamped at that point are quoted in detail from the report of the chief quartermaster of the Maneuver Division, showing the method by which twenty-one trains were loaded and despatched in less than three and one-half hours, distributing troops to nearly 200 different points. The organization, discipline, and control of division and corps supply trains is ably handled, quoting copiously from recorded experiences in the Civil War, Crimea, and elsewhere. The book concludes with an able exposition of the necessity for a peace organization which may be readily expanded to meet the requirements of the sudden occurrence of forces resultant upon a declaration of war.

W. R. C.

"Supplee's Mechanical Engineer's Reference Book." 2d edition, revised and enlarged. J. B. Lippincott Co.

As stated in the author's preface, this book is intended to be a successor to the well known pocket-book by John W. Nystrom, which, it appears, is now out of print. It contains all the usual standard tables of data required by the mechanical engineer, together with a number of useful additions which make it a thoroughly up-to-date work.

The metric conversion tables are particularly complete, and the extensive table of factors of numbers up to 9599 will be found a convenience in certain classes of computations. The metric steam tables are also likely to be of frequent use. The brief introductory notes on algebra, geometry, trigonometry, and differential and integral calculus are clear and concise, and the treatment of statics and dynamics is specially to be commended.

The chapter on internal combustion motors and rules for testing gas and oil engines, together with the extended treatment of the subject of practical electricity, make the work specially adapted to the requirements of the modern mechanical engineer. The tables showing the cost of power, viz.: water, steam, natural gas, producer gas, and electricity, are particularly valuable, because in each instance the authority is cited and the reader can refer to the original test for further particulars. This chapter would have been still more useful if a similar table had been given to show the cost of power from fuel oil. There is much data available, but it is not readily accessible to the busy engineer.

The second title, "Supplee's Mechanical Engineering," printed on the cover, seems unnecessary and confusing, but, on the whole, it is difficult to find anything but praise for this admirable storehouse of information.

"James Lawrence, Captain of the Chesapeake," by Albert Gleaves, Lieutenant-Commander, U. S. N. With an introduction by George Dewey, Admiral of the Navy. Illustrated. G. P. Putnam's Sons, New York and London.

Nearly a century has elapsed since the war of 1812. A half century went by before anything like an adequate history of the war from a naval point of view was written. President Roosevelt began such a history, completed the naval portion, and found that the war was so largely naval in its character that it was not worth while to add to his work the account of the operations on land. But as yet the biographical portion of that interesting time, from the present point of view, has not received adequate treatment. Captain Mahan's work, however, in process of publication, will to a great degree remedy this lack.

This volume is written for the man of to-day. It includes valuable material that has never been published.

Lawrence's career was comparatively short. He died a young man. There was something about the circumstances of his death that inspired the American people. There was something about his personality that charmed every one with whom he came into contact. To be sure his fame was short lived. This generation knows but little about him, but on that account there was so much the more need that his biography should be written; that men, and especially naval men, should see what kind of a naval officer he was and learn from his good qualities, as well as from his mistakes, something that will help them professionally.

The engagement of the Chesapeake with H. B. M. S. Shannon, which has been misunderstood, especially with reference to Lawrence's alleged unpreparedness for the engagement, needed to be told again. This is the fullest and best account that has been written.

The body of information found in the record of the court martial of Lieutenant Cox and others of the Chesapeake, now in the Judge Advocate General's Office, Navy Department, seems not to have been known by those hitherto writing of this action. The sworn testimony then taken is the most authentic account of the fight.

This must be the definitive biography of Lawrence, as every source of

information has been searched for material. The work needed to be done; it has been well done. It reflects credit upon the author for patience in gathering material, accuracy and clearness of statement, and adequacy of presentation. It should have many readers. E. K. R.

"Stirling." A book on Steam for Engineers.

This little manual is issued by the Stirling Boiler Company of Barberton, Ohio, primarily in the interest of their own boilers and appliances.

After giving a full and clear description of the construction of the Stirling boiler, it proceeds to discuss briefly the advantages of water-tube boilers in general and the fundamental principles which govern their design and construction.

In this connection the following subjects are treated, showing the practical application of the accepted themes, viz.: Heat and its measurements; air for combustion; feed water and its impurities; feed-water heaters; steam, steam tables, contained moisture, and flow through pipes; superheaters with an admirable exposition of the principles governing their design; combustion and heat losses; fuel, coal, gas, oil, wood, bagam, and Indian corn, and the methods of determining their values; fuel burning and utilization of waste heat; the Stirling chain grate stoker; chimney draught; analysis of gases; boiler efficiency; boiler horsepower; rules for conducting trials; principles of steam piping, good and to the point; boiler and pipe covering; boiler cleaning, care, and management; specifications for masonry for boiler settings.

Each of the above subjects is treated in an able manner and with brevity by making use of abundant illustrations, tables, and curves.

The little volume might well serve as a text-book, and if put into the hands of the boiler attendant of ordinary intelligence the practical points alone would likely save the owner a considerable sum on his bill for repairs and renewals.

It has also much that is of interest to engineers; for example, two tests of a Sterling boiler, burning oil, with an efficiency of 80.76 per cent and 83.14 per cent, respectively, and a comparative table of time and cost of repairs to a number of different types of boilers at the St. Louis Exposition.

W. F. W.

LIST OF PRIZE ESSAYS.

1879.

Naval Education. Prize Essay, 1879. By Lieut.-Com. A. D. Brown, U.S.N.

NAVAL EDUCATION. First Honorable Mention. By Lieut.-Com. C. F. Goodrich, U.S.N.

NAVAL EDUCATION. Second Honorable Mention. By Commander A. T. Mahan, U.S.N.

1880.

"The Naval Policy of the United States." Prize Essay, 1880. By Lieutenant Charles Belknap, U.S.N.

1881.

The Type of (I) Armored Vessel, (II) Cruiser best suited to the Present Needs of the United States. Prize Essay, 1881. By Lieutenant E. W. Very, U.S.N.

SECOND PRIZE ESSAY, 1881. By Lieutenant Seaton Schroeder, U.S.N.

1882.

Our Merchant Marine: The Causes of its Decline and the Means to be taken for its Revival. "Nil clarius aquis." Prize Essay, 1882. By Lieutenant J. D. J. Kelley, U.S.N.

"MAIS IL FAUT CULTIVER NOTRE JARDIN." Honorable Mention. By Master C. G. Calkins, U.S.N.

"SPERO MELIORA." Honorable Mention. By Lieut.-Com. F. F. Chadwick, U.S.N.

"CAUSA LATET: VIS EST NOTISSIMA." Honorable Mention. By Lieutenant R. Wainwright, U.S.N.

1883.

How may the Sphere of Usefulness of Naval Officers be extended in Time of Peace with Advantage to the Country and the Naval Service? "Pour encourager les Autres." Prize Essay, 1883. By Lieutenant Carlos G. Calkins, U.S.N.

"SEMPER PARATUS." First Honorable Mention. By Commander N. H. Farquhar, U.S.N.

"CUILIBET IN ARTE SUA CREDENDUM EST." Second Honorable Mention. By Captain A. P. Cooke, U.S.N.

1884.

The Reconstruction and Increase of the Navy. Prize Essay, 1884. By Ensign W. I. Chambers, U.S.N.

1885.

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1888.

Torpedoes. Prize Essay, 1888. By Lieut.-Com. W. W. Reisinger, U.S.N.

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The Enlistment, Training and Organization of Crews for our Ships of War. Prize Essay, 1891. By Ensign A. P. Niblack, U.S.N.

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On the subject of membership the Constitution reads as follows:

ARTICLE VII.

Sec. 1. The Institute shall consist of regular, life, honorary and associate members.

Sec. 2. Officers of the Navy, Marine Corps, and all civil officers attached to the Naval Service, shall be entitled to become regular or life members, without ballot, on payment of dues or fee to the Secretary and Treasurer, or to the Corresponding Secretary of a Branch. Members who resign from the Navy subsequent to joining the Institute will be regarded as belonging to the class described in this Section.

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